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the Iron Age

E NATIONAL METALWORKING WEEKLY

June 7, 1951

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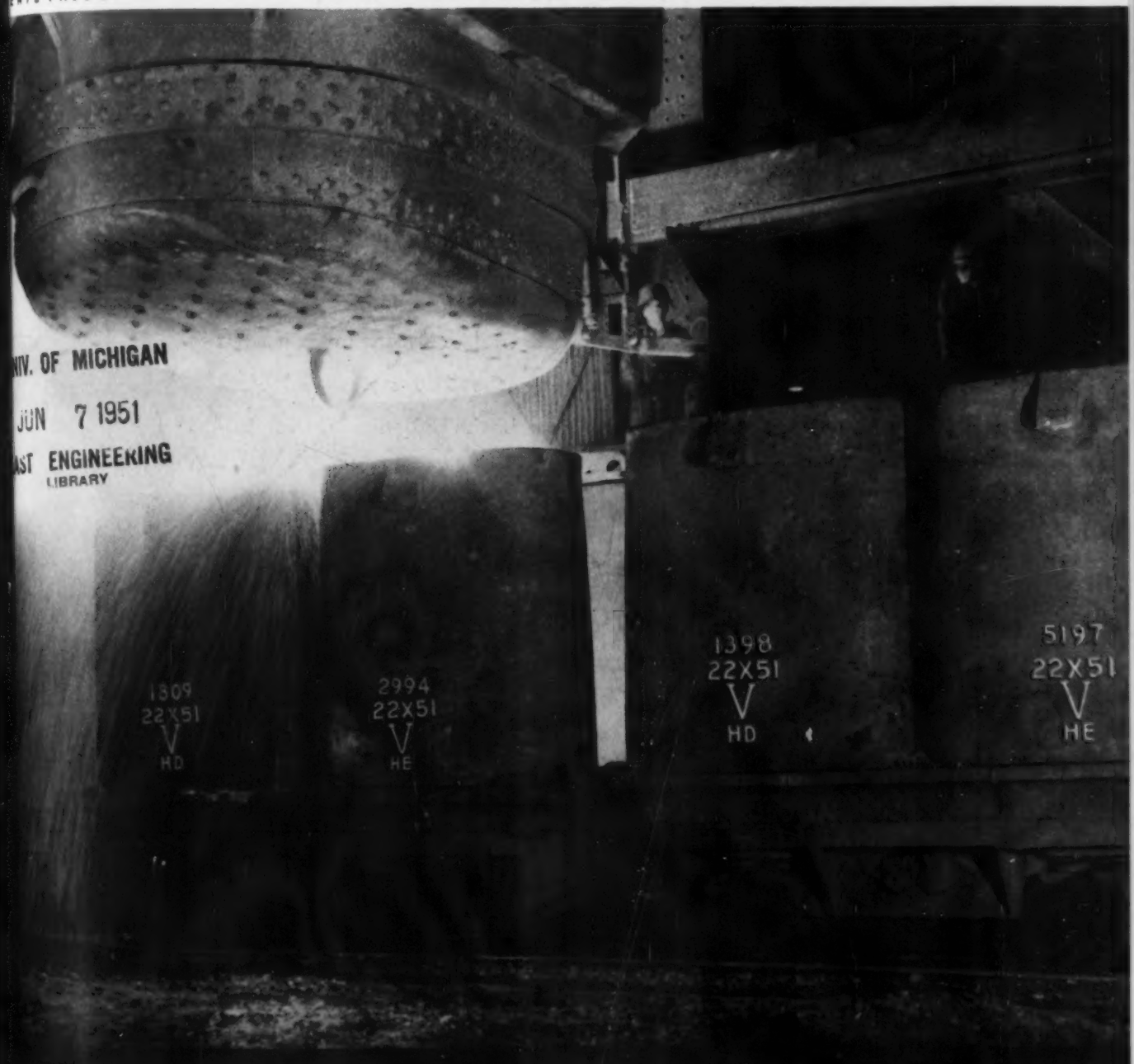

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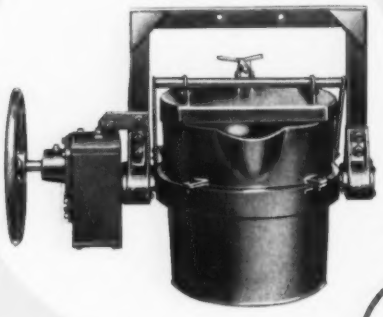

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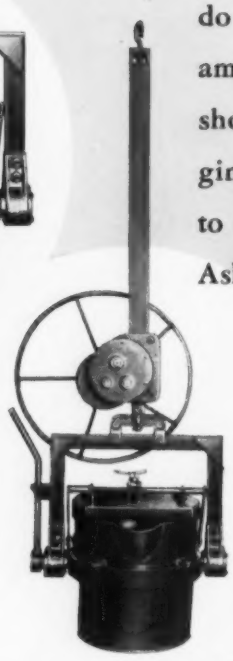

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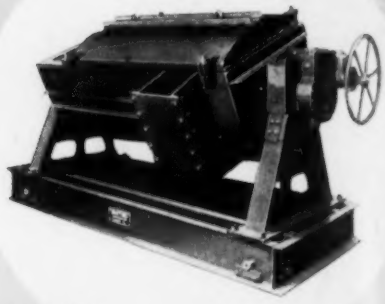

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IRON AGE

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IRON AGE *summary*

iron and steel industry trends

Steelmakers will continue hot pace through summer . . . Employees help by working through vacations . . . Scrap problem still serious.

Just Routine—Production miracles are becoming commonplace in the steel industry. Just a few years ago it was considered quite a feat when the steelmaking rate reached 100 pct of rated capacity—even for a short time. Yet this marks the 14th week during which the industry has operated at or above its rated capacity. What's more, a survey by THE IRON AGE shows that steel companies plan to maintain their hot pace right on through the summer months.

In past years there were very good reasons why steelmaking traditionally slumped during the hot summer months—even when demand remained high. Chief reasons were: (1) Vacations, (2) need for maintenance, (3) hot weather. Some companies adopted the practice of virtually shutting down their plants for a 2-week vacation period. During this time melting operations might be maintained at 50 pct, but finishing mills would be shut down completely—while maintenance repairs were being made. Even the mills that staggered vacations found that a combination of hot weather and absence of experienced workmen hurt production.

Workers Help—But this year steel companies are making every effort to maintain near-capacity operations. And it looks as if they will succeed. Even mills that formerly closed down during a plant-wide vacation period expect to keep going full blast. Under the urgent pressure of defense demands they have learned to overcome production obstacles of vacations, maintenance, and weather.

However, the steel companies could not do this without the cooperation of the steel workers and their union. Although the labor contract assures vacations for steel workers, the union has agreed that they may stay on the job if they wish. Because of this, even mills that formerly encouraged workers to take vacations are this year urging them to stay on the job. Those who agree to do so are of course receiving their vacation pay as a form of bonus.

Good Maintenance—In one company where workers had a choice of working or vacationing over 95 pct chose to work—and accept "bonus" vacation pay. This is a good deal higher than the industry average, but more and more workers are expected to stay on the job as they see their fellow employees drawing extra pay. Steel companies also expect to pay a lot of overtime this summer to keep output up.

In spite of the terrific pounding steelmaking equipment has taken during the long period of capacity-plus operation, steel plant maintenance has been kept up remarkably well. Steelmakers have learned how vital maintenance is. Maintenance crews are better trained and they do the job quicker than ever before. Also, planned maintenance and preventive maintenance have become common words. A few years ago they were unheard of.

Scrap Trouble Ahead—Hot weather can still hurt steel output but it can't flatten it as it used to. Steelworkers are constantly being educated on how to protect themselves by proper diet, proper clothing, etc. In addition, many hot jobs are now protected by mechanical devices, such as air-conditioning. All this pays off in more production.

Right now some steelmakers are more concerned over scrap supplies than they are over a possible summer slump. So far the scrap pinch has caused no serious production losses. But scrap supplies are still a touch-and-go problem with most mills. Even if they are able to squeeze through the summer (as now seems likely), scrap procurement will become even tougher when cold weather again slows collection. Increased demand for scrap resulting from the steel expansion program is expected to strain our scrap resources for a long time to come.

Steelmaking operations this week are scheduled at 103.5 pct of rated capacity, unchanged from the previous week.

(Nonferrous summary p. 170)

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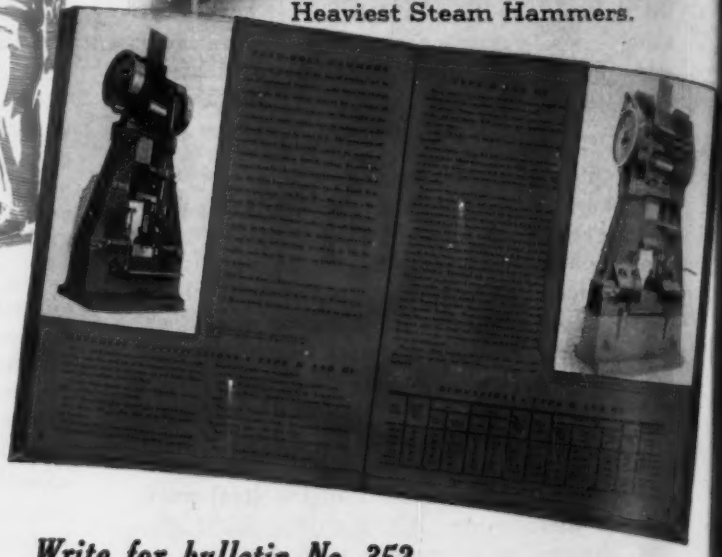

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IRON AGE *introduces*

Leo F. Hunderup, appointed vice-president and general manager of the GREENFIELD TAP & DIE CORP. Mr. Hunderup will assist in the management of the company's plants in Greenfield and the Geometric Tool Co. Div., in New Haven, Conn.

Dr. Edwin Wetterstrom, joined the research and development staff of GRAVER TANK & MFG. CO., INC., Chicago, as analytical engineer.

G. W. Reese, appointed general manager of manufacture of the AMERICAN CAN CO., New York. **F. J. Green** and **C. F. Lausten,** named assistant general managers of manufacture. **R. B. Thompson** and **A. T. Augensen** were named managers of manufacture of the Atlantic and Pacific divisions respectively.

Thomas J. Hanley, promoted to supervisor of electrical and hydraulic turbine service and erection of the ALLIS-CHALMERS MFG. CO., Milwaukee.

Jay E. Browder, appointed chief of the radio communications engineering section of KOLLSMAN INSTRUMENT CORP., Elmhurst, N. Y.

Walter K. Palmer, appointed an assistant comptroller and director of cost control for KAISER STEEL CORP., Oakland, Calif.

Leo S. Banul, appointed manager of the Chicago warehouse of BLISS & LAUGHLIN, INC. Mr. Banul succeeds acting manager, **Charles W. Zerler,** who is being moved into the sales department.

Leo F. Brown, appointed works manager at Ambridge, Pa., of NATIONAL ELECTRIC PRODUCTS CORP.

Eugene C. Bauer, elected chairman of the board of the KENSINGTON STEEL CO., Chicago. Other officers elected: **Eugene C. Bauer, Jr.,** first vice-president; **Roy W. Sergeant,** treasurer and assistant secretary. **Anthony J. Frystak** was elected secretary and **H. M. Albers** was appointed sales manager.

Gordon Miscall, joined the PARKER APPLIANCE CO., Cleveland, as industrial sales engineer.

George T. Morse, Jr., became president and general manager of the PEDEN IRON & STEEL CO., Houston. **W. E. Blumberg,** appointed sales manager, industrial division.

R. H. Jeffrey, elected chairman of the executive committee of the JEFFREY MFG. CO., Columbus, Ohio. Other officers elected: **R. W. Gillespie,** chairman of the board of directors; **C. J. Leifeld,** executive vice-president; and **J. E. M. Wilson,** vice-president and manager, mining division.

J. P. Somers, appointed assistant vice-president of WYCKOFF STEEL CO., Pittsburgh, with headquarters in Philadelphia.

James L. Spencer, elected vice-president and director of sales of the OLIN PRODUCTS CO., INC., New York.

William J. Josko, advanced to sales manager with headquarters in Chicago, by the JAMES FLETT ORGANIZATION, INC. **James L. Johnson** was made Washington representative.

William S. DuBois, joined HARBISON - WALKER REFRACTORIES CO., Pittsburgh, as head of the market research department.

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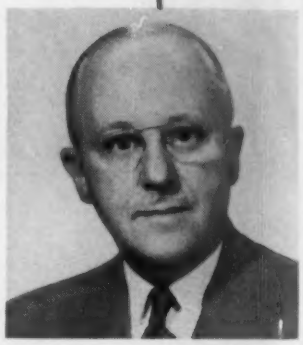

KENNETH JENSEN, elected president of the Kensington Steel Co., Chicago.

J. H. FULFORD, elected president of the Jeffrey Mfg. Co., Columbus, Ohio.

J. S. ROSCOE, appointed director of purchasing of the Lincoln Electric Co., Cleveland.

IRON AGE

salutes

J. C. Argetsinger

THEY say the best thing a man can do for his country and his company is to be active in public life. Many try. Many don't—so they say—have the time.

One man who successfully found time is J. C. Argetsinger, vice-president of Youngstown Sheet & Tube Co. until he recently retired. His efforts have made him known and loved throughout the Mahoning Valley.

A warm, human kindliness has flowed from J.C. in business, civic, and personal relationships. He has awakened in others a feeling of kinship.

Schools, colleges, banks, manufacturers' groups, clubs have acknowledged him their leader—a forceful yet friendly voice. His directness and kindliness have won friends—gotten much work done for company and civic groups.

After a hitch with the Insular Service in the Philippines and a stint as editor of a weekly, J.C. joined Erie R.R.'s legal staff in 1915. Erie asked him to go to Youngstown to handle clearing of titles and purchase of land. He liked Youngstown and the city liked him.

He joined a local law firm. In 1923 when Youngstown Sheet & Tube began negotiations for purchase of Brier Hill Steel Co., J.C. was asked to handle details. As a result of this work he joined the company as assistant general counsel. He later became general counsel and in 1936 was named vice-president.

J.C. has helped weld together one of the nation's great steel companies. His keen judgment will continue to benefit the company he now serves as consultant.

E. L. CASEY, elected vice-president in charge of manufacturing of the E. W. Bliss Co., Canton, Ohio.

DOUGLAS H. MILLER, elected treasurer of Automatic Steel Products, Inc., Canton, Ohio.

WILBUR T. CLARK, appointed chief engineer of blast furnaces for Republic Steel Corp., Cleveland.

MILLS N. RIPLEY, appointed New York regional manager for the Lamson Corp., Syracuse, N. Y.

IRON AGE *introduces*

Continued

James J. Collins, appointed vice-president and general manager of IRON & STEEL PRODUCTS, INC., Chicago. **Edward J. Sagert** has been appointed vice-president, **William J. Parker, II,** appointed general superintendent along with **Warren C. Stevens.**

J. R. Mohlie, appointed works manager of heavy line plants for the OLIVER CORP., Chicago. **R. G. Rogers** was named works manager for light line plants. **N. O. Panzegrau,** named to succeed Mr. Mohlie as director of defense operations.

Albert G. Lauzon, named president and **Hal O. Gummere** vice-president and general manager of the BUCKEYE TOOLS CORP., Dayton. **Ervin Reeves** was named treasurer and **Earl Hamilton,** secretary.

Edward Hopkinson, Jr., elected chairman of the executive committee of BALDWIN - LIMA - HAMILTON CORP., Philadelphia. Others elected: **Charles E. Brinley, Joseph N. Ewing, Gwilym A. Price, William Wood Prince, George A. Rentschler, John J. Rowe** and **Marvin W. Smith.**

Roy W. Kroeger, appointed assistant chief engineer, Cleveland district, for REPUBLIC STEEL CORP.

Carl H. Wittenberg, made a partner of FORD J. TWAITS CO., Los Angeles, and will serve as general manager of the company.

William H. Bingham, appointed Eastern district manager of the WESTINGHOUSE ELECTRIC SUPPLY CO. Mr. Bingham will be located in Long Island City, N. Y. **E. M. Lacey** was named Eastern district manager of the consumer products division.

Howard Elliott and **Frank J. Scanlan,** appointed district sales representatives for the Star-Kimble Motor Div. of MIEHLE PRINTING PRESS & MFG. CO., Bloomfield, N. J.

Allan Hoover and **Deane W. Malott,** elected directors of PITNEY-BOWES, INC., Stamford, Conn.

Fred Wohlfarth, appointed manager of installation throughout the U. S. for all the products of the LAMSON CORP., Syracuse, N. Y.

Edward J. Brichta, appointed sales manager of the industrial air-cooled engine division of CONTINENTAL MOTORS CORP., Muskegon, Mich.

William L. Carpenter, named manager of the tire plant in Oaks, Pa., of the B. F. GOODRICH CO., succeeding **James F. Sweatt** who becomes manager of the company's tire plant in Los Angeles.

John Meade, joined the administrative staff of FANSTEEL METALLURGICAL CORP., Chicago, as director of industrial relations.

Russell J. Cameron, elected president of ROSS OPERATING VALVE CO., Detroit. Mr. Cameron succeeds **John Sainsbury** who will remain as an active consultant and member of the Board of Directors.

David E. Feinberg, appointed a vice-president of the U. S. AIR CONDITIONING CORP., Minneapolis.

OBITUARIES

William M. Powell, president of the Diamond Mfg. Co., Wyoming, Pa., at the age of 58. Mr. Powell was also president of the National Assn. of Perforated Metal Manufacturers, secretary-treasurer, Power Engineering Co. of Wilkes-Barre and president of the Luzerne County Branch of the Penna. Manufacturers Assn.

Eugene J. McCleary, for 21 years manager of the blast furnace division of the Great Lakes Steel Corp., at his home.

Ralph Cunningham, vice-president and director of the General Box Co., and manager of the Detroit division, at the age of 61.

William Thomas Wamsley, manager of the Kansas City warehouse of Wheeling Corrugating Co., at his home there. Mr. Wamsley started as a salesman with the company in 1924.

Charles L. Eshleman, one of the organizers and former president of Griswold-Eshleman Co., in Cleveland recently.

B. T. Dye, industrial relations superintendent at Republic Steel Corp.'s Buffalo Works.

T. M. Heermans, assistant manager of sales of Allis-Chalmers Mfg. Co.'s centrifugal pump department, in Milwaukee. Mr. Heermans was 62.

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automotive news and opinions

Tooling bottleneck tightens . . . Ford has purchased 108,000 machine tools since the company started . . . Wage boosts coming

by Walter G. Patton

Defense Showdown—Many believe the automobile industry is headed for a showdown with the defense effort—not only on materials but on tooling as well. Machine tool shops are loaded. Deliveries on standard machines are months away. Some builders of specialized machine tools say they are booked through August 1952.

During recent weeks several auto producers have placed a substantial volume of business with Michigan foundries where these orders for dies must compete with castings needed for machine tools. A major machine tool source in the Detroit area has been reported 700 pct oversold.

Pricing Treadmill—It is known that Washington is unsympathetic to some of the engine tooling programs now being placed. Meanwhile, machine tool sources report the industry has practically been pushed on a treadmill by government price regulations. Unable to predict the course of rollbacks, some producers say they have declined even to consider new business.

Tooling Particulars—The tooling requirements for high volume automobile and defense production are thought-provoking. At Cincinnati last week, Del S. Harder, Ford vice-president-manufacturing, gave 600 Ford suppliers the tooling bill of particulars.

Ford has purchased 108,000 machine tools since the company started. At the present time there are about 35,000 in operation. Since 1946 Ford has spent $150 million for machine tools and another $70 million for other equipment. The aircraft division at Chicago will require 2700 tools. Another 600 machine tools will be needed for other defense projects, including welding equipment.

Advance 20 Pct—Since Korea and up to Mar. 2, tooling prices have advanced 20 pct. A representative group of nine standard machine tools used by Ford have had price advances as high as 61 pct. In each case the machine models compared were identical.

Between June 1950 and March 1951 the cost of purchased parts at Ford has increased 12 pct. During the same period, labor rates have advanced 13 pct. Harder said that Ford's labor cost had jumped from $1.98 per hr during June 1950 to an estimated $2.30 for June 1951, including an anticipated 7¢ raise during June.

Gets Things Done—Clay P. Bedford, former executive vice-president, Kaiser-Frazer Corp., has been appointed assistant to Mobilization Director Charles E. Wilson.

Bedford has been in charge of manufacturing operations for Kaiser-Frazer since 1945. Recently he has been associated with Henry J. Kaiser on the West Coast. Bedford made a major contribution in getting the Willow Run plant into auto production and obtaining the necessary steel and other materials to keep the plant operating.

His reputation for getting things done, both in the Kaiser shipyards and at Willow Run, is tops. Edgar Kaiser, Bedford and Warren Huff are credited with authoring the "Miracle of Procurement" that has been an outstanding feature of the K-F operation.

Foundry Training Ground—International Harvester's $1,200,000 investment in mechanized research foundries is attracting considerable attention. Basic equipment has been installed for about 9 months. A research cupola will be added before the end of the year.

The IHC research foundry is operated entirely by college graduates. The company is using these facilities as a training ground.

Eventually, it is expected that experimental castings will be made covering the entire size and weight range of castings used by the company.

Warner-Gear—The scope of operations of automobile industry suppliers often comes as a sur-

assembly line

Continued

prise even to those in close contact with the motor car industry. Warner-Gear, which makes transmissions, overdrive units, synchronizers, parking brakes and automotive gears, is an example.

The company supplies parts to Chrysler, Ford, Hudson, International-Harvester, Kaiser-Frazer, Nash, Packard, Studebaker and Willys-Overland among others. A potential 10,000 automobiles, including passenger cars and trucks, are built each working day containing one or more products produced by Warner-Gear at its Muncie plants.

Materials Requirements—At the present time three plants located in Muncie have 38 acres under roof. There are 4000 machine tools and 24 heat treating furnaces in use. More than 1500 different types of parts are assembled into transmissions, overdrives and synchronizers.

Average quarterly materials requirements are enormous. More than 47 million lb of steel and 24 million lb of cast iron are used every 3 months. Over 200 trucks dock at Warner-Gear each day to deliver or receive shipments.

Testing Autos—Testing materials and gaging parts is only half of the job of building an automobile. Regular checks of the assemblies and the completed car are routine practice with most carmakers.

Automobile Facts describes several such tests. A partial vacuum is created inside the car, drawing powdered chalk dust into the car to check body sealing. Using specially constructed rollers to stimulate different road surfaces, road noises can be studied up to 70 mph. Another sealing test consists of shooting high pressure jets from many directions to check body leaks. DeSoto checks the sealing of each body coming off the assembly line by this method.

Small Motor Demand—The demand for small motors, ranging from ¾ to 2½ hp, has pushed Continental Motors Corp., Detroit, into a 25 pct expansion program.

Continental's orders for small engines are at an all-time high, running at the rate of approximately 160 pct greater than a year ago. The demand for power lawn mowers, compressors, garden tractors and heaters for the Armed Services has contributed substantially to this large volume.

Strike Unlikely—While a strike could be precipitated by failure of the Wage Stabilization Board to approve the 4¢ annual improvement bonus, it seems unlikely that a work stoppage will develop in the auto industry even though an immediate decision by WSB is not forthcoming.

Last week Carl Stellato, president of Local 600, threatened to call a strike at the Rouge if a 4¢ an hr wage boost was not authorized. Stellato's argument was apparently borrowed for the occasion from John L. Lewis, "No contract; no work." Later in the week, the strike threat was withdrawn.

Both General Motors and Ford believe an annual improvement bonus should be paid. Any wage boost granted will be retroactive. If Local 600 had called a strike at Ford, it would have been striking for something the workers seem certain to get without a strike.

Cost-of-Living — Approximately 335,000 hourly-rated employees received an additional 3¢ per hr cost-of-living allowance from General Motors beginning June 4.

At the same time 83,000 GM salaried employees received an additional $15 or a total of $95 cost-of-living allowance for the period between June 1 and September 1. The allowance will be paid next September.

Under the GM formula, wages and salaries are reviewed quarterly and adjusted in line with changes in the Consumer Price Index of the U. S. Bureau of Labor Statistics. The BLS Index for Apr. 15 was 184.5 compared with 181.6 for Jan. 15.

THE BULL OF THE WOODS

By J. R. Williams

WHAT'S HE WAITIN' FOR? I'D BE AFRAID A GUY THAT FAR GONE COULDN'T BE REVIVED EVEN NOW!
OH, THEY DON'T USE SUCH CRUDE METHODS NOW, LIKE JUST WAKIN' YOU UP AN' BAWLIN' YOU OUT--THEY USE PSYCHOLOGY--BUT BY TH' TIME THEY THINK UP SOME OF IT, YOU'VE HAD A COMPLETE REST.
6-8
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DENISON HydrOILics

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Northwest Plant Revived—Seidelhuber Steel Rolling Mill Corp. of Seattle has revived plans for construction of a small electric furnace melting operation and rolling mill to cost about $1 million.

About 5 years ago Frank J. Seidelhuber, Jr., president, announced plans for a $3½ million plant. Company spokesmen now report the melting furnace is scheduled for operation soon after Aug. 1. The rolling mill will be in production in 1952.

Under Blast—Fears that Geneva Steel Co. would have difficulty in getting manpower to operate the blast furnace at Ironton, Utah, leased from Kaiser-Frazer Parts Corp. were needless. Indications are it will be under blast by the middle of this month. The crew of 250 men was recruited in 2 weeks.

Operation of the furnace which has been idle 2 years won't help the immediate pig supply. As soon as it is producing at the rate of 600 tons per day one of the three 1200-ton blast furnaces at Geneva plant will be shut down for relining. Benefits will come later.

Employment High — Geneva's employment is highest on record with 5000 at the steel plant and a total of 7000 in the state.

Indicative of the impact Geneva Steel has had on the economy of the state is the report that Utah's first quarter payroll covered by unemployment insurance this year was $96.9 million, whereas the highest first quarter during the war was $62.8, and in 1940, $25.1.

Ore Worth—Geneva Steel Co. and Colorado Fuel & Iron Co. have offered a compromise on the issue of iron ore values for tax purposes.

They have offered to accept a figure of $5 per ton while the Utah commission is demanding valuation of more than $10 per ton. Last year $1.55 was the figure used. However, Utah Construction Co. which mines Utah ore for sale, hasn't even agreed to the $5 figure.

More for Japan — Latest contract for iron ore for Japan has been reported from the Iron Age (no connection with this publication) mine in southern California where 600,000 tons are to be shipped at the rate of 30,000 tons per month.

Ferro Corp. of Los Angeles is handling the shipment with Gibbons & Reid operating the mine east of Twenty-nine Palms.

Aluminum Pro and Con—Further expansion of aluminum production in the Pacific Northwest was assailed recently by George Gunn, Jr. speaking for the Washington State Industrial Commission. The industrialist asserted allocation of power to primary aluminum producers is handicapping efforts to bring in new industries and expand existing industries.

Should Reallocate Power — Bonneville Power Administration should allocate the 160,000 kw it had conditionally set aside for Eastern Metal Products Co. and Independent Aluminum Co., to existing distribution agencies, Mr. Gunn believes. Options on this power recently expired.

Last week E. Norman Purser, public relations director for Alcoa at Wenatchee, Wash., replied by reporting: there are 452 industries in the Northwest using aluminum pig and ingots; in Clark County, Wash., where Alcoa's reduction plant is located, there are 1300 families dependent on that industry; and that in 1950 his company paid out $11 million in wages, materials and services.

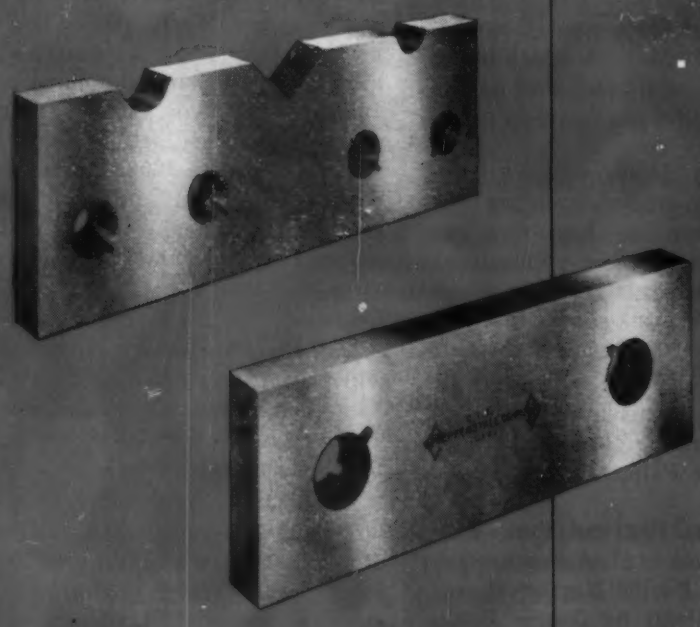
One Big Fabricator—Aluminum will play an important part in the $4 million contract on which Brown Trailers, Inc. is working in Spokane for the Quartermaster Corps.

Included are 1200 refrigeration boxes and 236 semi-trailer refrigerators which have a capacity of 1000 cubic feet. Normal production of standard commercial trailers will not be interrupted and the labor force will be increased from 400 to 600 this month to take care of the double load. The company also has a plant at Toledo, Ohio.

. . . The Swords of Damascus

According to tradition, these keen blades were laboriously hammered at the forge until they resembled the "color of the moon" when quenched. To test the cutting edge, the blade was placed in a slow stream —cutting edge upstream. A piece of silk was floated downstream; if it was severed on contact, the blade was acceptable!

FAMOUS Blades



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the federal view

this week in washington

by George H. Baker

Conflicting Estimates — Difference between the Gibson (DPA) figure of 40 pct defense-take of steel and the Fleischmann (NPA) estimate of 50-pct-plus is easily explained. NPA merely includes a greater number of related, or what have come to be known as "supporting," programs.

Not so easily explained — and cause for increased lifting of eyebrows—is why top officials continue to stand by these estimates. Actually, neither agency knows.

Not Before August—Nor will they have a sound basis for such estimates before August (some officials say later). The recent figure of 135 pct of production as representing essential requirements under CMP was based upon reported requirements up to the time DPA had to make initial program determinations if CMP was to get started July 1. Thus, this figure actually represents an estimated "rate," rather than real needs. A reasonably clear picture will not be evident much before the fourth quarter.

How Long Controls?—Mobilizer Charles E. Wilson estimates that in less than 2 years the nation will be geared to production sufficient for both domestic and defense needs and controls can then be discarded. But other top-level officials are saying that the nation must look forward to at least a decade, perhaps a generation, of defense production.

Weapons become obsolete, and must be scrapped. Production machinery and equipment ditto, to take care of modern developments. And in such event, they say, once industry is gripped tight by controls, can they be discarded so long as the nation is on a defense preparation basis?

"Phony" Wage Control—Charges hurled by departing members of the Wage Stabilization Board that the program is a phony may force Economic Stabilizer Eric Johnston to meet an issue he has thus far successfully ducked.

One resigning member, J. Ward Keener, vice-president, B. F. Goodrich Co., declared that WSB seems to exist only for the purpose of approving wage increases.

Keener feels Johnston junked his own program by giving in to John L. Lewis, the non-operating railway employees, meat-packing employees, and by okaying wage-escalator clauses that result in over-ceiling pay envelopes.

Write-Off Decision Due — Is amortization of plant and equipment — particularly 5-year "defense" write-off — an allowable cost in government procurement contracts?

Munitions Board and Defense Dept. take the position that it is not. Many business men insist that it is. Defense Mobilizer Charles E. Wilson is about to umpire the dispute.

Several of Wilson's top advisers have quietly let it be known that they believe amortization to be a legitimate cost of doing business. But pressure from the Pentagon could force an adverse decision, despite Wilson's awareness of the burden such a ruling could force on defense contractors.

Short-Term Lease—Political advantages of a short-run (60 to 90 days) extension of the Defense Production Act are beginning to influence congressional thinking on the subject.

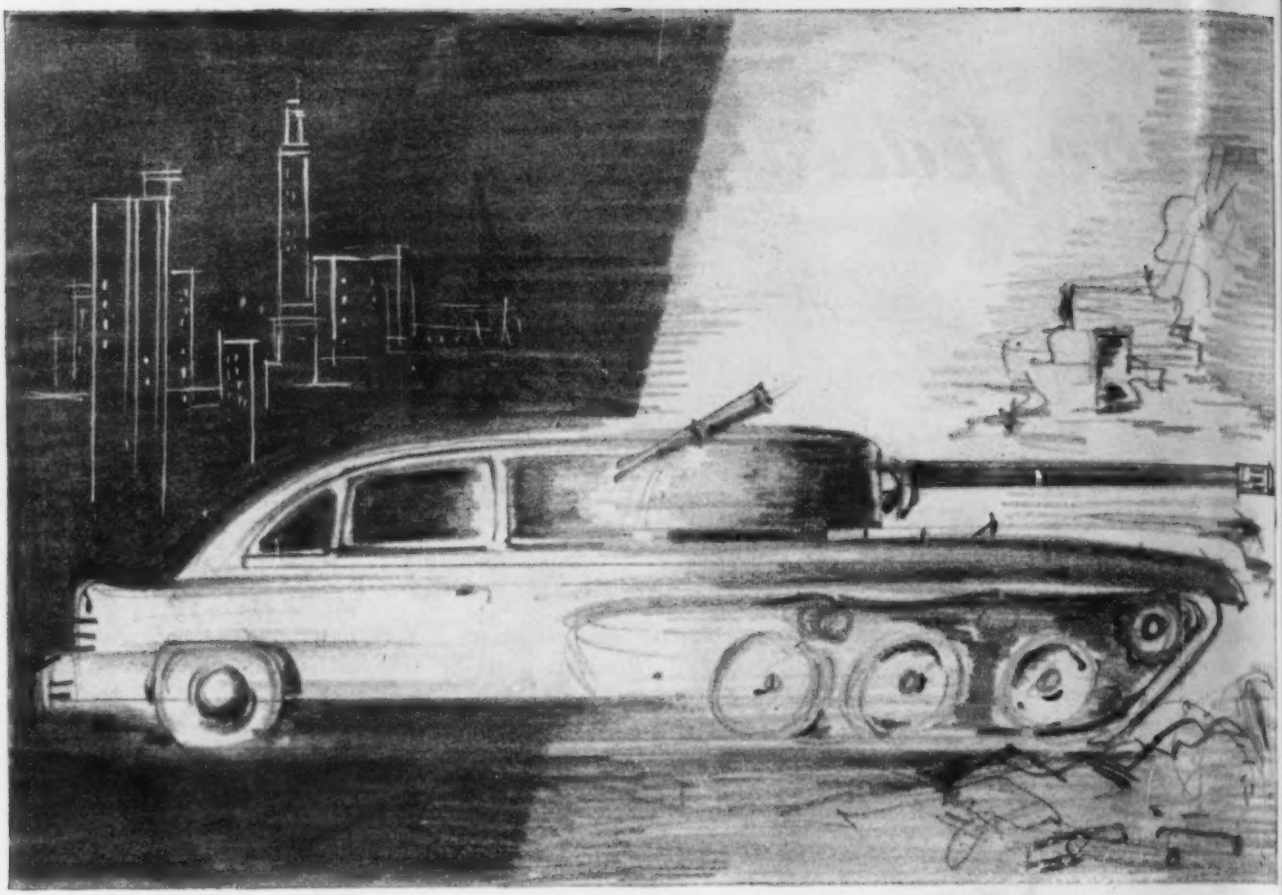
Members on both sides of the Capitol aisles now are agreed that there's only the dimmest possibility of winding up the public hearings in time to write and pass a new bill before the June 30 expiration date.

Look More Closely—Supporters of the temporary extension say Congress should take time to consider the Korean war more closely, and to look into the probable effects of the new tax bill on business and on the public.

There's still considerable pressure to strike out all price- and wage-control sections of the bill, leaving only materials controls intact.

Accent on Speed—Sea-strategy planners now believe shipping convoys have outlived their usefulness.

Merchant ship construction should emphasize speed and self-sufficiency, according to naval warfare experts.



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THE IRON AGE
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TECHNICAL ARTICLES

VAPOR PACKAGING

keeps rust off weapons, tools

by Major Gilbert Foster
U. S. Air Force
Assigned to Small Arms Branch, Industrial Div., Office Chief of Ordnance
U. S. Army

A new Government specification covers the new rust preventives that inhibit corrosion by surrounding ferrous weapons and machine tools with protective vapor. Readying a grease-coated M-1 rifle for combat required at least 3 hours of hard work. A weapon in a corrosion inhibitor wrapper can be fired minutes after it is unwrapped and wiped off. Cleaning damage is eliminated.

The military services are making use of a promising new family of rust preventives called volatile corrosion inhibitors. This unique method of using vapors to prevent rust is playing an increasingly important part in the packaging of weapons, Fig. 1. The applications discussed here are military but the methods set forth can be easily adapted for industrial use.

A coordinated military specification, MIL-P-3420, Packaging Materials, Volatile Corrosion Inhibitor Treated, has been recently approved. Copies should now be available through the following offices: Bureau of Supply Accounts, Dept. of the Navy, Washington 25, D. C.; Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton; any Army Procurement office. This specification is not limited to any single chemical compound but applies to all products which prevent corrosion while in the vapor phase.

To qualify for inclusion on the government's Qualified Products List, samples submitted for approval will undergo government laboratory investigation and a twelve month service test. The specification also requires an active inhibitor load of 2g per sq ft of carrier material. The standard 1g loading should be sufficient for most industrial use.

Several products broadly classified as volatile corrosion inhibitor materials are now available commercially, made by Angier Corp., Framingham, Mass.; Central Ohio Paper Co., Detroit Div., Detroit; Cromwell Paper Co., Chicago; Marvellum Co., Holyoke, Mass.; Nox-Rust Chemical Co., Chicago; Orchard Paper Co., St. Louis; Shell Development Co., New York; Thilmany Pulp & Paper Co., Kaukauna, Wis.

However, since the bulk of the military information and experience has been with dicyclohexylammonium nitrite, the writer has selected it for review. It is made by the Shell Development Co. Sold under the trademark "VPI," it is available in crystal form, as well as with those binding agents added which are required for application to packaging materials.

Packaging materials already coated with volatile corrosion inhibitors are also available.

In the past, almost all protective methods in-

FIG. 1—In the time it takes to disassemble an M-1 rifle so that the job of cleaning it of older type preservatives can get under way, the identical weapon can be taken out of a vapor corrosion inhibitor envelope, wiped and fired.

volved dipping or spraying weapons with heavy grease, Fig. 2. The removal of this coating is often a difficult operation. To hard-pressed combat troops, it can present a serious situation. In the field, proper facilities for cleaning are usually limited or non-existent. In the Arctic, low temperatures cause the grease to congeal.

Recent published reports from Korea tell how weapons are being immersed in boiling water to remove the heavy preservative or cleaned with a wire brush and gasoline. This latter method always presents a serious fire hazard. In addition to the risk of life, cleaning operations of this type can easily cause damage.

Industrial packaging problems are seldom as complex or severe as those of the military. Military items may require protection for temperatures ranging from —70° to +165°F. Material may stand for weeks in heavy tropical rains. Or, as more recently in Korea, in deep snows and sub-zero temperatures. A storage period may last for twenty five years as it did between World War I and World War II. The requisites of a good preservative are therefore dependent on the end in view.

With the above military requirements in mind a preservative should afford: a) *protection against corrosion (under a wide variety of conditions)*, b) *ease of removal*, c) *ease of application*, d) *a simple inspection procedure*, e) *economy and availability*.

Inhibiting vapors permeate pack

Vapor corrosion inhibitors function by volatilization, with the resultant vapors permeating the pack. Upon contact with the metal, some of the vapors condense and form an invisible protective film entirely surrounding the packaged article. Even intricately designed tools are penetrated and protected. Moisture and oxygen are effectively neutralized as long as the dicyclohexylammonium nitrite remains concentrated within the barrier wrap. Present military practice specifies that treated surface area must equal metallic area to be protected.

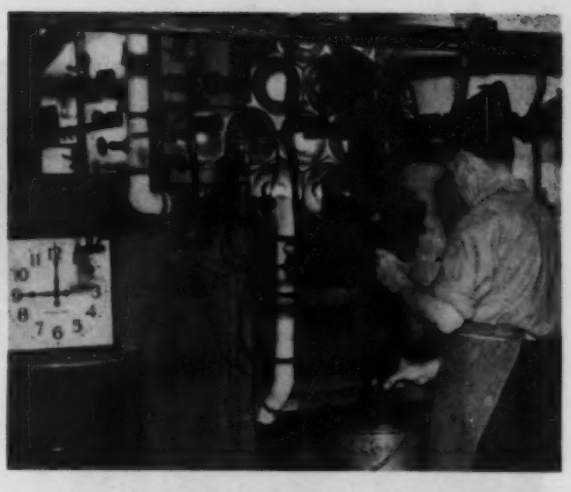
Vapor phase inhibitors are now recommended primarily for the protection of ferrous metals. Since the protection of steel and iron products is the more important problem, most of the work to date has been done in this field. Investigations are currently being conducted to determine to what extent these rust preventives can be employed with other metals. In a 23-month Ordnance Corps test, both ferrous and non-ferrous metal items were tested, under Arctic, temperate and tropical conditions. Better protection was obtained with vapor corrosion inhibitor packaging than with the regular methods of packaging.

The length of protection procured is largely dependent upon maintaining a tight seal, thus keeping to a minimum the amount of air to be inhibited. Adequate protection for domestic shipments, short term storage, or many civilian items can be secured by wrapping the part in an inhibited paper and enclosing it in a simple container.

There is no cleaning problem. Fig. 3 shows corrosion-inhibitor-packed weapons being packed and later removed from bags. A case of ten rifles, packed in grease, requires nearly 27 skilled man-hr to be readied for combat. In contrast, ten rifles packed with a volatile corrosion inhibitor would require approximately ½ man-hr.

Skilled personnel or expensive machinery are not needed. However, certain precautions are required, such as keeping the metal surfaces thoroughly cleaned and free of fingerprints and corrosion. No volatile corrosion inhibitor is an exception to this rule. They are not "cure-alls," but, instead, are effective and economical tools if properly used.

Inspection can be quite easily performed. Civilian packs or military domestic packs are



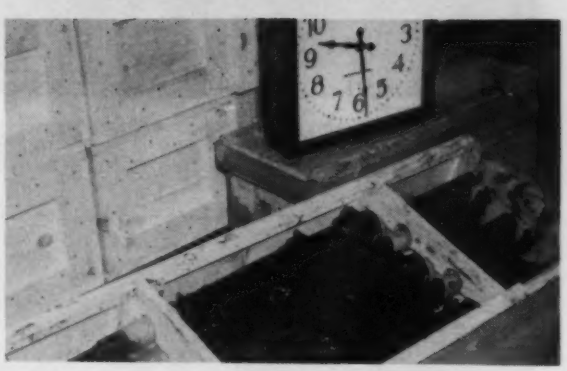


FIG. 2—(from top to bottom) Current method of preserving M-1 rifle with heavy grease. As the clock in the photos indicates, 3 hr and 45 min are required for disassembly, dipping, assembly, packing, unpacking, disassembly, cleaning and assembly. Cleaning and reassembly alone take one man 2 hr and 45 min. He missed lunch.

easily opened, unwrapped, checked for corrosion, rewrapped and replaced in containers. Sealed containers of the type shown in Fig. 4 are opened by cutting off the end near the seal. The weapon is then inspected, reinserted in the bag and closure is made by heat-sealing or with tapes.

The use of volatile corrosion inhibitors is practically always more economical than older methods. Cleaning damage and costs are reduced to a minimum or eliminated. Man-hours are saved. The machine gun package, Fig. 4, reduced material and labor costs almost a third. An added benefit was a 5-lb weight saving due to removal of the desiccating agent formerly used. On rifle pinions, packaging costs alone were reduced 40 pct.

Availability has been no problem. Sales agencies are widely distributed throughout the country. The materials can be easily supplied for use by field troops.

Since 1947, the Industrial Division of the Ordnance Corps has been testing VPI for the preservation of machine tools. Consequently, Ordnance was ready when the accelerated defense program necessitated widespread movement of production machinery. Larger and larger shipments, going to the factories from the Government's machine tool reserves, are now being protected as shown in Fig. 5. This ingenious treatment was evolved at Indiana Arsenal from an experimental program underway since 1947 at Twin Cities Arsenal.

Stuff gear boxes with bagged inhibitors

Materials used are simple: a) *Loosely woven cloth bags filled with shredded vapor phase inhibitor paper,* b) *creped 60-lb* VPI *kraft paper,* c) *sealing tape,* d) *a recently developed vinyl-chloride plastic shroud which remains flexible at very low temperatures.* The inhibitor-filled bags are used for corrosion prevention in complicated gear boxes and for other surfaces that usually cannot be protected with regular grease type preservatives. They are also used to cushion and protect edges and other sharp projections.

The top and sides of the machine are draped with sheets of the corrosion inhibitor paper. The fabricated plastic cover is then placed in position and the machine is ready for shipment or temporary storage. This system is being used very effectively where reactivation of production lines

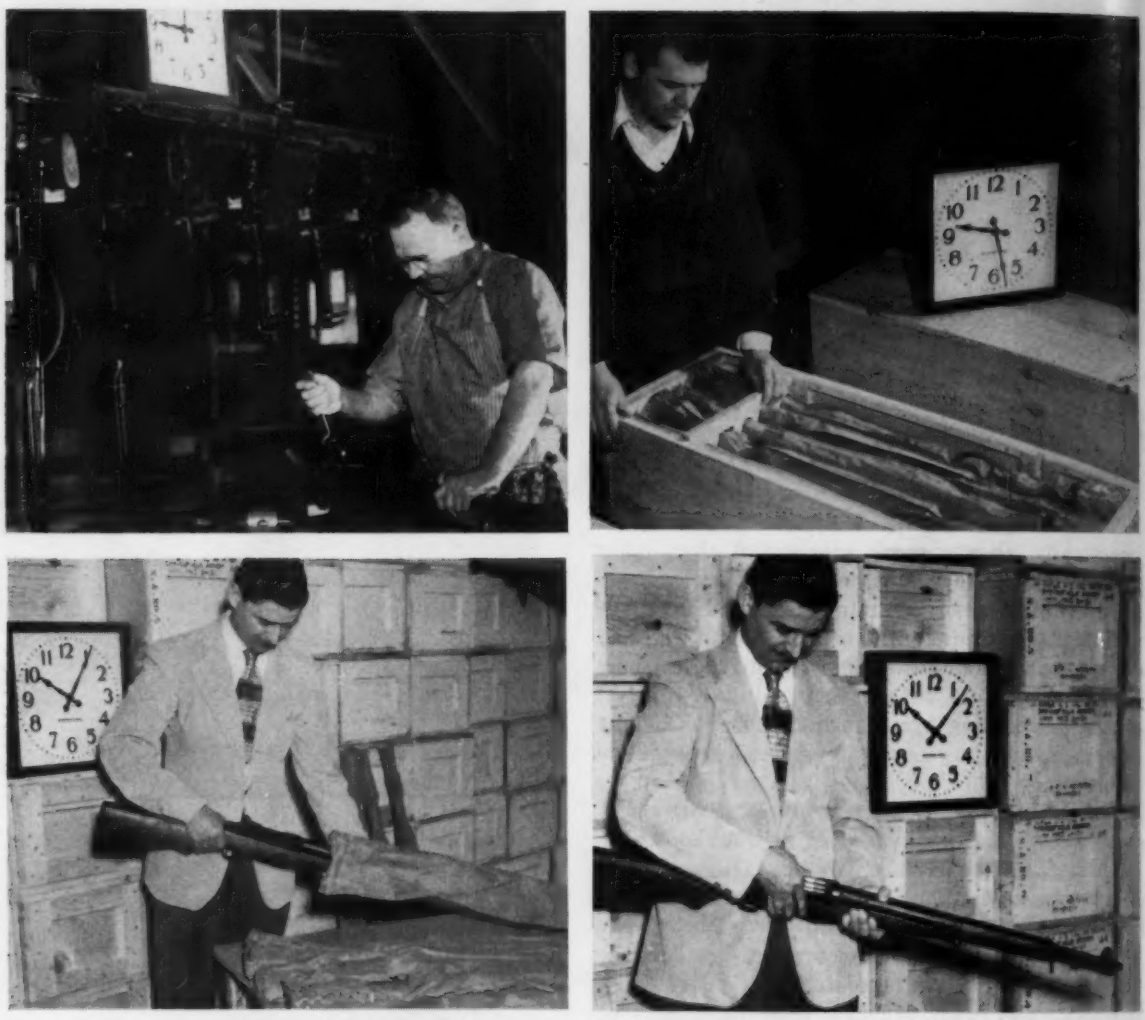


FIG. 3—(left to right, top to bottom) Proposed method of preserving M-1 rifle with vapor-corrosion-inhibitor wrapper. As clock indicates, a little over an hour is required for disassembly, dipping, assembly, packing, unpacking and wiping. There is no disassembly after unpacking; only simple wiping off of light oil is required. The jacket, sport, light, is not authorized for issue to troops.

FIG. 4—Air Force hand arms, machine gun, survival kit rifle and rifle-shotgun are shown ready for insertion in their individual types of corrosion-inhibitor packings. Wrapper consists of layers of cotton scrim, plastic-coated-one-side aluminum foil and a sheet of VPI-coated kraft paper.

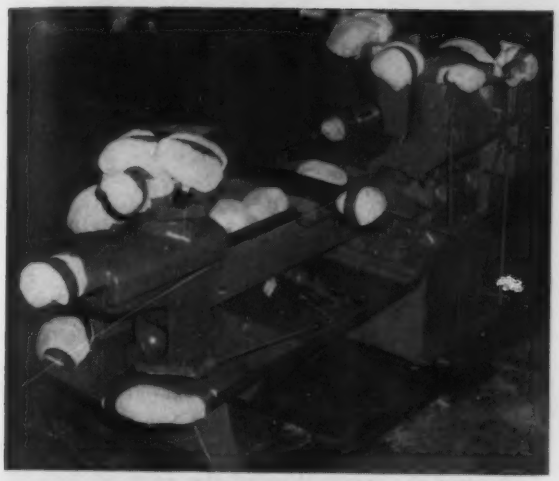


FIG. 5—(from top to bottom) Machine tools being moved from the Ordnance Corps reserve to production lines are protected by two types of coated packing. Shredded corrosion inhibitor paper in porous cotton bags are stuffed into gear box and are also used to protect other unprotected surfaces, as well as cushioning edges and projecting parts. Machine is then draped with corrosion-inhibitor paper and enclosed in vinyl-chloride shroud. Bottom would have to be enclosed for long-term storage.

has forced outdoor storage of large machine tools. For economical long-term storage, closure of the underside would be necessary to retain the vapors as long as possible.

With the exception of the proposed M1 rifle pack, all weapons shown in the accompanying photos are now being packaged in volatile corrosion inhibitors, either by the Air Force or by the Ordnance Corps for the Air Force. Scientists at Wright-Patterson Air Force Base are monitoring the program very closely.

Springfield Armory, long the Army's small arms center, early recommended volatile corrosion inhibitor packaging and are proposing wider military usage. Actual adoption is now awaiting results of several accelerated storage tests. All large scale military applications, with the exception of that for the machine tools have been developed by the Armory for the Air Force.

Frankford and Rock Island Arsenals, along with other Ordnance technical centers and depots, have been assigned phases of the program consistent with their prescribed missions. Overall control and direction of the Ordnance program is exercised by the Research and Development Div., Office Chief of Ordnance.

The Army Field Forces were recently briefed on the latest progress with the new preservative method. They are now considering it for the protection of weapons used by them.

The Navy has had an extensive testing program underway since 1945. Technical research by the Naval Research Laboratory has contributed greatly to the military utilization of the new inhibitors.

Close coordination is being maintained between all three services and industry. Information has been freely exchanged and several cooperative projects are now in progress. One such project covers an investigation of the protection of armament installed in aircraft. Another industry-Ordnance test is utilizing in part techniques developed by the airlines for the preservation of stored engines.

The views expressed here are those of the author—not necessarily those of the Army or Air Force Depts.

DIRECT-READING SPECTROGRAPH IS *Faster, More Accurate*

As the spectrum line of each component in an alloy is evaluated, this new French spectrograph gives a direct reading—as well as a printed record in a calibrated drum chart. Photoelectric cells replace the usual photographic plate.

by B. J. Tufty
Seine-et-Oise
France

A spectrograph for the direct reading of spectrum lines of alloys is now being developed in the laboratory of the Compagnie Radio-Cinema, in Paris, France (Fig. 1). The apparatus uses a head unit with electron multiplier photoelectric cells to replace the usual photographic chassis. The results of the analysis can be read immediately by eye and are also recorded on a high-speed calibration chart. The average time for one analysis is one minute. For an unknown analysis, a photographic plate may be inserted and the regular procedure followed.

Only two photoelectric cells are used, and these are lodged in the head unit. The one, a standard photocell located at one end of the spectral range, is stationary and views the internal standard line of the highest component of the alloy. The other cell is mobile. It scans the spectrum and can be stopped on selected lines desired for exposure and analysis.

During the exposure periods, the ratio of the outputs of the two photocells is measured by the electronic equipment. By this method, the whole spectrum of the alloy can be scanned and recorded. A possibility for further research lies in the fact that this apparatus also can measure the light between the spectrum lines.

At present the making of an analysis is automatic, after completion of the pre-burn period.

Automatic analysis parts in head unit

The head unit (Fig. 2) houses all the parts necessary for automatic analysis. Two electron multiplier photoelectric cells, developed by Prof. Lallemand of the Paris Observatory, have replaced the regular photographic plate. Each cell is lodged in a metallic screen provided with a slit before a cesium photocathode and a mirror which directs the incident beam on to the cathode.

The standard cell, stationary at one or the other end of the spectrum, catches an intense beam of light from the base metal of the alloy. The other cell is driven along the focal plane of the spectrograph by means of a lead screw which itself is driven by an electric motor. This cell measures the intensities of the rays of different elements of the alloy, one after another. Two parallel rulers of steel, with slots to provide a coarse and a fine control, guide this mobile cell along the spectrum.

The cell is stopped at the selected spectrum line in the following manner: a) *When the mobile photocell nears the position of a selected element line, a vane on its carriage engages with a slot on the coarsely controlled metal ruler;* b) *this action causes the electric motor to run at slow speed;* c) *the depth to which the vane engages with the slot selects the sensitivity setting of the element channel amplifier;* d) *a second vane then engages with a slot on the finely controlled bar;* e) *this is then moved along with the cell carriage until an electrical contact causes the motor to stop instantly.*

The cell is then in the correct position for analysis. With this system, it is possible to stop the cell within plus or minus 2 microns of the position of the line.

The correct positions of the slots in the rulers are obtained from a photograph of the alloy spectrum to be studied.

Several advantages are offered by this method. The steel bars are mounted in a manner to compensate for the displacements of the spectrum caused by changes in temperature. They also assure the extreme slowness of the mobile cell and stop it without vibration for each analysis. By means of adjustable end-stops, analysis may be limited to any given region of the available spectrum. A change from one analysis to another

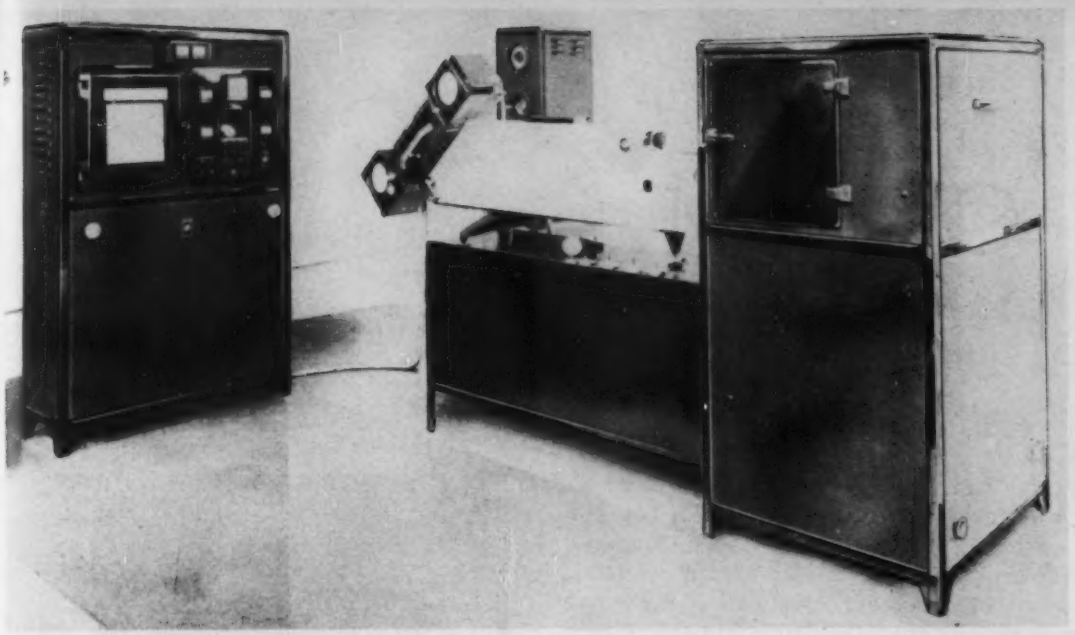


FIG. 1—Spectrograph equipment used for direct reading of the spectrum lines of alloys. From left to right, the amplifier and recorder, the Jobin & Yvon quartz prism spectrograph with head, the spark generator cabinet.

can be simply achieved by fitting the appropriate slotted bars.

An electro-magnetic clock determines the time during which the photoelectric cell views each line. When this period is ended, the vanes on the cell carriage are disengaged from the slot and the cell is moved along at high speed to the position of the next line.

The current of the photomultiplier is carried across a resistance to the amplifier where the voltage is recorded. The first stage of each of the two amplifier channels is located on the head unit. This is done so that connections to the photocells shall be as short as possible.

The sensitivity of the amplifier is altered by switching in different resistance as required. For the standard line channel, the switching is done by hand. For the element line channel, the selector mechanism on the traversing gear is used. Except when the photocell is stopped on the element line, the input to both amplifiers is grounded.

FIG. 2—The head unit, showing the two spectrum line indicators for checking the position of photoelectric cells which are inside the unit, together with the parallel steel bars that guide the mobile cell.

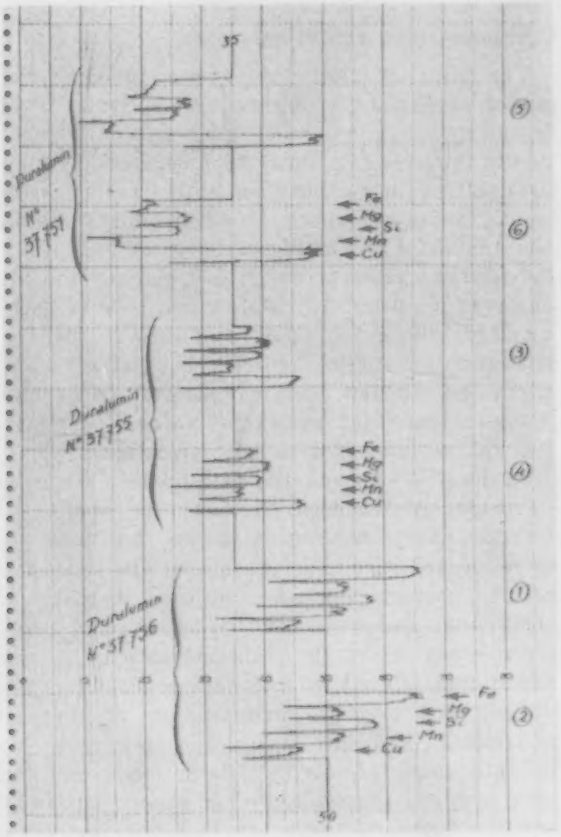


FIG. 3—This sample chart record from the direct reading spectrograph indicates the amount of iron, molybdenum, silicon, manganese and copper in an aluminum alloy.

DIRECT READING

SPECTROGRAPH IS Faster, More Accurate

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A spectrograph for the direct reading of spectrum lines of alloys is now being developed in the laboratory of the Compagnie Radio-Cinema, in Paris, France (Fig. 1). The apparatus uses a head unit with electron multiplier photoelectric cells to replace the usual photographic chassis. The results of the analysis can be read immediately by eye and are also recorded on a high-speed calibration chart. The average time for one analysis is one minute. For an unknown analysis, a photographic plate may be inserted and the regular procedure followed.

Only two photoelectric cells are used, and these are lodged in the head unit. The one, a standard photocell located at one end of the spectral range, is stationary and views the internal standard line of the highest component of the alloy. The other cell is mobile. It scans the spectrum and can be stopped on selected lines desired for exposure and analysis.

During the exposure periods, the ratio of the outputs of the two photocells is measured by the electronic equipment. By this method, the whole spectrum of the alloy can be scanned and recorded. A possibility for further research lies in the fact that this apparatus also can measure the light between the spectrum lines.

At present the making of an analysis is automatic, after completion of the pre-burn period.

Automatic analysis parts in head unit

The head unit (Fig. 2) houses all the parts necessary for automatic analysis. Two electron multiplier photoelectric cells, developed by Prof. Lallemand of the Paris Observatory, have replaced the regular photographic plate. Each cell is lodged in a metallic screen provided with a slit before a cesium photocathode and a mirror which directs the incident beam on to the cathode.

The standard cell, stationary at one or the other end of the spectrum, catches an intense beam of light from the base metal of the alloy. The other cell is driven along the focal plane of the spectrograph by means of a lead screw which itself is driven by an electric motor. This cell measures the intensities of the rays of different elements of the alloy, one after another. Two parallel rulers of steel, with slots to provide a coarse and a fine control, guide this mobile cell along the spectrum.

The cell is stopped at the selected spectrum line in the following manner: a) *When the mobile photocell nears the position of a selected element line, a vane on its carriage engages with a slot on the coarsely controlled metal ruler;* b) *this action causes the electric motor to run at slow speed;* c) *the depth to which the vane engages with the slot selects the sensitivity setting of the element channel amplifier;* d) *a second vane then engages with a slot on the finely controlled bar;* e) *this is then moved along with the cell carriage until an electrical contact causes the motor to stop instantly.*

The cell is then in the correct position for analysis. With this system, it is possible to stop the cell within plus or minus 2 microns of the position of the line.

The correct positions of the slots in the rulers are obtained from a photograph of the alloy spectrum to be studied.

Several advantages are offered by this method. The steel bars are mounted in a manner to compensate for the displacements of the spectrum caused by changes in temperature. They also assure the extreme slowness of the mobile cell and stop it without vibration for each analysis. By means of adjustable end-stops, analysis may be limited to any given region of the available spectrum. A change from one analysis to another

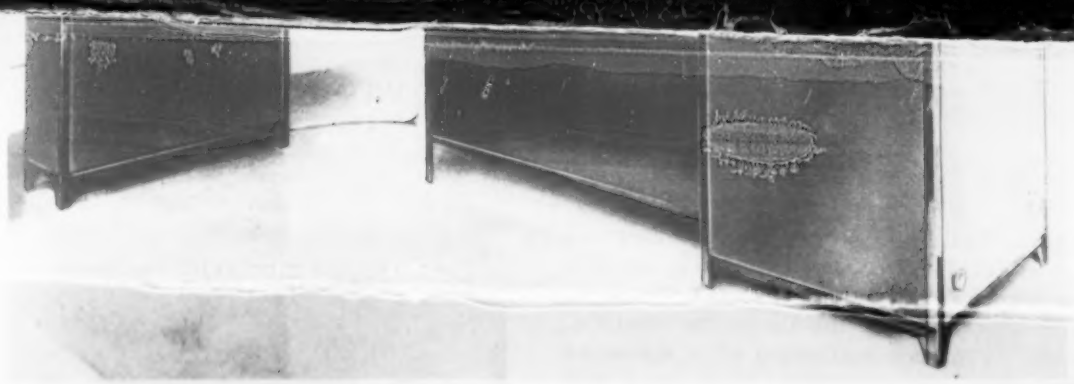

FIG. 1—Spectrograph equipment used for direct reading of the spectrum lines of alloys. From left to right, the amplifier and recorder, the Jobin & Yvon quartz prism spectrograph with head, the spark generator cabinet.

can be simply achieved by fitting the appropriate slotted bars.

An electro-magnetic clock determines the time during which the photoelectric cell views each line. When this period is ended, the vanes on the cell carriage are disengaged from the slot and the cell is moved along at high speed to the position of the next line.

The current of the photomultiplier is carried across a resistance to the amplifier where the voltage is recorded. The first stage of each of the two amplifier channels is located on the head unit. This is done so that connections to the photocells shall be as short as possible.

The sensitivity of the amplifier is altered by switching in different resistance as required. For the standard line channel, the switching is done by hand. For the element line channel, the selector mechanism on the traversing gear is used. Except when the photocell is stopped on the element line, the input to both amplifiers is grounded.

FIG. 2—The head unit, showing the two spectrum line indicators for checking the position of photoelectric cells which are inside the unit, together with the parallel steel bars that guide the mobile cell.

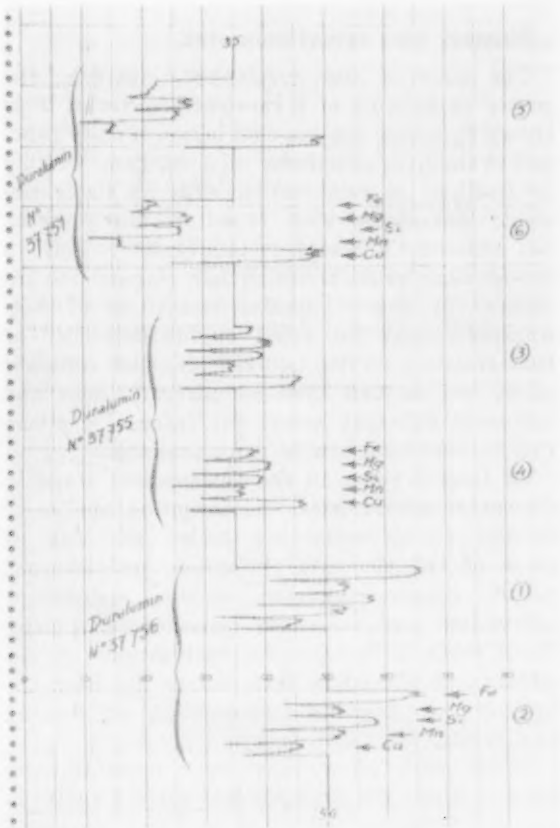

FIG. 3—This sample chart record from the direct reading spectrograph indicates the amount of iron, molybdenum, silicon, manganese and copper in an aluminum alloy.

CERIUM

increases use of wrought stainless

Certain "difficult-to-work" high-alloy, corrosion resistant and heat resistant steels can now be readily hot-worked. The application, developed in the laboratories of the Carpenter Steel Co., involves the proper application of a rare-earth element called cerium obtained from places such as Florida, Idaho, India and Brazil.

Possibilities of increasing mill yields from ingot to hot-rolled bars, plates, tubes and forgings of corrosion and heat resistant steels is claimed. This is made possible because the new range of cerium-bearing alloys promotes greater hot ductility and reduces rejects. Forgers get the benefits of better hot-working, fewer cracks and tears, as well as better finishes requiring less machine cleanup. The discovery is being made available to all steel producers through licensing agreements (Pat. No. 2,553,-330).

CONE TEST for hot forgeability. A cast cone of the metal to be tested is heated to selected forging temperature and upset or hammered flat. Visual tests can be used to determine the optimum amount of cerium to be used in a particular grade of steel, and also to determine the best range of forging temperatures. The two pancakes shown are of the exact same analysis . . . except that the one on the left, relatively free of cracks and tears, contains cerium.

Lathanum also sometimes used

The core of the development involves the proper application of a rare-earth element, little known by name, yet one that serves a daily function in the lives of millions of Americans. Cerium by itself or in combination with its sister element, lanthanum, both found in misch metal, has enabled Carpenter metallurgists to solve a hot-working problem which has plagued the industry for years. Greater quantities of hot-workable alloys for many applications such as heat resistant baffles and shields, heat resistant parts for jet and turbojet aircraft, heat and corrosion resistant valves for internal combustion engines may now be more available.

At least 7 years in the development stage in Carpenter laboratories, the invention applies to ferrous alloys containing nickel and one or more of the elements chromium, molybdenum, cobalt, copper, tungsten, silicon, manganese, columbium and vanadium. Heretofore, a principal obstacle to the full utilization of the advantages offered by these alloys has been the difficulty or practical impossibility of forging and rolling them into desirable shapes.

While many efforts have been made to solve this problem, the obstacle has existed throughout the industry for years and has restricted the uses of these alloys in certain applications involving high temperatures, stresses and pressures. For example, certain alloys containing nickel, chromium, molybdenum and copper which provided satisfactory corrosion resistance could be cast satisfactorily—but when hot-working was attempted, the resulting bars were so badly torn or cracked that they were unusable. This has limited their use to those fields in which castings could be used. The Carpenter invention transforms those alloys into products that can be readily hot-worked and turned out in greater quantities by existing mill facilities.

Heretofore, the chief uses of cerium and its compounds have been found in cored carbon for flaming arcs, in flints for cigarette lighters, and in the ceramic industry. The principal source of cerium and lanthanum is monazite sand. The supply of cerium and lanthanum recently has received a boost because of the intense interest in certain heavy elements so vital to the production of atomic energy. Some of these heavy elements can be obtained from thorium, which is found in some monazite sands.

Those Carpenter corrosion and heat resistant grades included in the new cerium-bearing alloy range, and patented as such, include stainless AISI types 309, 310, 316, 317, 330, as well as Carpenter stainless 20, and Carpenter austenitic valve steels. The invention applies not only to ferrous alloys containing more than 50 pct iron, but also to nonferrous alloys containing little or no iron.

UNGROUND HOBS REDUCE GEAR TOOL COST

By Fred Bohle
Chief Engineer
Illinois Tool Works
Chicago

Unground hobs are less expensive than ground hobs and give about 20 pct more life. They may be as accurate as B tolerance ground hobs in the popular range of 6 to 20 D. P., provided standard sizes and steel analyses are used. The unground hob substantially lowers tool costs in high production jobs.

Once a gear is designed and its material specified, the problem of cost reduction becomes one of saving man hours and reducing tool costs. Accurate unground hobs are gaining wide acceptance as they effectively solve half of the problem, particularly in high volume gear production where hobbing is followed by shaving.

The combination of lower original cost and increased sharpening life represents a considerable saving in tool costs wherever unground hobs can be applied properly. However, like all other classes of hobs, they have a distinct field in which they are particularly useful. As they are applied away from their field of usefulness, the gain in tool cost may be offset by such things as an increase in shaving cost or a larger number of rejects.

Hobs are divided into four classes according to their accuracy: Classes A, B, C and D. Each group has a distinct set of tolerances for each hob element. These elements can be grouped into three main sections: (1) The supporting elements, i.e., holes, hubs and faces; (2) the cutting faces, gashes or flutes; and (3) the form and helical arrangement of the hob teeth.

Accurate unground hobs made by Illinois Tool Works, Chicago, marketed under the trade name "Certified," show tolerances for the hole and the hubs identical to those for class B ground hobs. The same holds true for the sharpening and lead tolerances.

Hobs do their work by generating. This means that the generated profile is produced by numerous individual cuts. It is through a systematic sequence of cuts that straight-sided hob teeth produce involute profiles and curved hob teeth generate straight-sided splines.

As far as the hob is concerned, it is the helical arrangement of its teeth that places the individual cuts in the generating process. From the standpoint of accuracy in the gear, it is therefore important that all hob teeth are correctly aligned along the helix.

Fig. 1 shows the permissible lead error in any

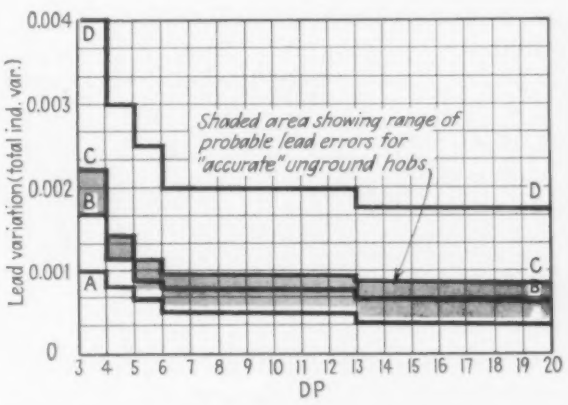

FIG. 1—Permissible lead error in any one complete turn of hob teeth for all four classes of hobs. Unground hobs may be better than maximum error for B tolerance hobs.

one complete turn of hob teeth for all four classes of hobs. The lines for A, B, C and D tolerances indicate that the maximum error may not go beyond the line indicating their class. However, it is rather unlikely for a D tolerance hob to be within A tolerance limits. To a lesser extent the same holds true for unground or C tolerance hobs. B tolerance ground hobs, however, may well come out within A tolerance limits.

In all probability, hobs ground to A tolerance will fall within the area below the A line; B tolerance ground hobs will fall below the line for B and beyond A; C tolerance or unground hobs will fall below C and beyond B and D tolerance between D and C.

The shaded area of Fig. 1 shows that accurate unground hobs may be better than the maximum permissible lead error for B tolerance ground hobs in the popular range of 5 to 20 D.P. However, chances are against their reaching A tolerance as frequently as B tolerance ground hobs will. Therefore, the shaded area belonging to the unground hobs does not quite reach A and goes below B tolerance on pitches coarser than 5 D.P.

Tolerances fix error bottom

This illustrates that the established hob tolerances merely fix the bottom for the errors and that, in all probability, the quality of the hob will be between its specified class and the next higher class.

There is one essential difference between unground hobs and ground hobs which is all in favor of the former—the useful sharpening life is greater. Ground hobs are finished with very small cup wheels; in spite of the fact that only the smallest wheels are used, the length of the ground surface is limited by interference. Fig. 2 shows this condition on a typical 8 D.P. hob tooth, ground and unground. A safe assumption for unground hobs is a 20 pct increase in sharpening life over equivalent ground hobs.

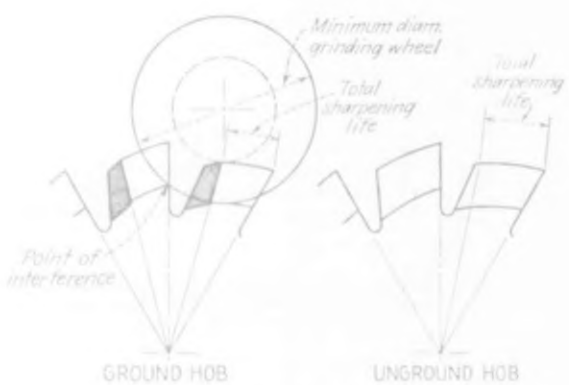

FIG. 2—Even though the smallest wheels are used to finish ground hobs, the length of the ground surface is limited by interference. Unground hobs, therefore, exhibit about a 20 pct increase in sharpening life.

In their application, however, a word of caution is necessary. There is no point in trading a lower tool cost for a subsequent higher manufacturing cost. The unground hob can only help to lower the cost of tools as such. In the case of limited production, tool cost is usually negligible and the expense of producing gears is largely a matter of setup time, cutting to size and checking. There are seldom any subsequent finishing operations like shaving. The gear manufacturer wants to be sure to avoid rejects and it will pay to invest in the additional assurance of accuracy of a ground hob.

The proper place for accurate unground hobs is on high production jobs where the tool cost is a substantial part of the total cost. In such a case, the correct approach is the cut-and-try method. If the gears seem to shave all right and the inspection department accepts them as perfectly good gears, the user of unground hobs can realize a substantial savings.

A trial with only one hob may not tell the story correctly. Hobs are not made with a uniform error; the tolerances merely fix the maximum. The errors in a given hob will probably be between that maximum and the maximum of the next superior class.

Accuracy of the C tolerance unground hob is somewhat lower than that of the B tolerance ground hob. This can be expressed differently by saying that the average accuracy of 100 ground B tolerance hobs is somewhat higher than the average accuracy of the same number of unground hobs. Therefore, if the cut-and-try method is used, it should deal with averages and involve a number of hobs. If shaving costs or the number of rejects have not increased, then the accurate hob is the one for the job.

Machine, hob have separate effects

While the function of the machine and the hob are closely interlocked in a relatively complex cutting process, both have their own individual spheres of influence. The machine and the blank are exclusively responsible for any runout and spacing errors, whereas the hob affects the shape of the individual gear teeth. The action of the hobbing machine and the constantly varying cutting strains can also affect the shape of the generated profiles; but inaccuracies in the hob will have their own influence on the shape of the involute gear teeth, over and above any errors introduced by the machine and the cutting process.

Fig. 3 illustrates the relationship between hob lead and the resulting involutes of gear teeth. It shows how lead errors duplicate themselves in the profiles of the gear teeth. One specific position between hob and work is shown. If the position of the hob is altered, the position of the high and low spots along the involute is correspondingly changed. While the position may change, the magnitude of the errors remains the same.

Deviations from the straight pressure angle of the hob tooth may also account for some involute errors. Further bad results are introduced whenever the hob runs out in the hobbing machine or has been sharpened with runout or spacing errors.

The original accuracy of the hob lead is only one of several contributors to the ultimate accuracy of the finished gear. Any intelligent selection of the proper class of hob is made on the basis of allowing the hob a certain portion of the maximum tolerable error in the finished gear. One rule of thumb allows 50 pct of the maximum involute error in the gear for the lead tolerance of the hob.

In high production it is definitely uneconomical to specify a superior class of hob to make up for poor machines and inferior practices of sharpening and mounting hobs. In most cases, it is more economical to take advantage of a lower price tool and to watch the machines and the practices of the operators.

Below are tabulated some of the approved tolerances for accurate unground hobs which have recently been adopted by the Metal Cutting Tool Institute. This type of hob has been officially established as a separate class.

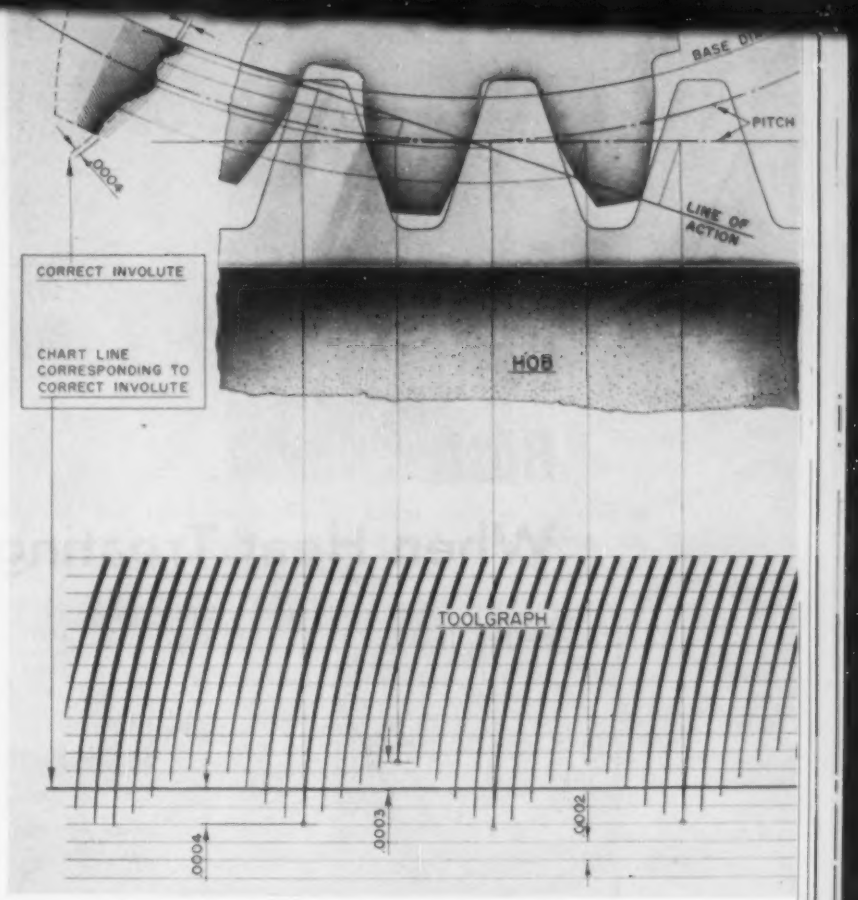

FIG. 3—The relationship between hob lead and the resulting involutes of gear teeth, showing how lead errors duplicate themselves in the gear teeth profiles.

LEAD TOLERANCES

Diametral Pitch		1 Thru 1.999	2 Thru 2.999	3 Thru 3.999	4 Thru 4.999	5 Thru 5.999	6 Thru 8.999	9 Thru 12.99	13 Thru 19.99	
Lead variation tooth to tooth total ind. var.	A	0.0007	0.0006	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	Precision ground
	B	0.0010	0.0008	0.0006	0.0004	0.0003	0.0003	0.0003	0.0003	Commercial ground
	C	0.0015	0.0012	0.0008	0.0006	0.0005	0.0004	0.0004	0.0004	Accurate unground
	D	0.0025	0.0020	0.0016	0.0014	0.0012	0.0010	0.0010	0.0008	Commercial unground
Lead variation in one turn total ind. var.	A	0.0025	0.0018	0.0010	0.0008	0.0008	0.0005	0.0005	0.0004	
	B	0.0035	0.0025	0.0017	0.0011	0.0009	0.0007	0.0007	0.0006	
	C	0.0045	0.0035	0.0022	0.0014	0.0011	0.0009	0.0009	0.0008	Accurate unground
	D	0.0060	0.0050	0.0040	0.0030	0.0025	0.0020	0.0020	0.0018	
Lead variation in three turns total ind. var.	A	0.0038	0.0028	0.0018	0.0012	0.0009	0.0008	0.0008	0.0007	
	B	0.0053	0.0038	0.0022	0.0016	0.0012	0.0011	0.0010	0.0009	
	C	0.0070	0.0050	0.0030	0.0021	0.0016	0.0014	0.0013	0.0012	Accurate unground
	D	0.0120	0.0100	0.0080	0.0060	0.0050	0.0040	0.0035	0.0025	

SHARPENING TOLERANCES

Diametral Pitch		1 Thru 1.999	2 Thru 2.999	3 Thru 3.999	4 Thru 4.999	5 Thru 5.999	6 Thru 8.999	9 Thru 12.99	13 Thru 19.99	
Flute to flute spacing total ind. var.	A	0.0040	0.0030	0.0025	0.0020	0.0015	0.0010	0.0010	0.0010	Precision ground
	B	0.0060	0.0045	0.0040	0.0030	0.0020	0.0015	0.0015	0.0010	Commercial ground
	C	0.0060	0.0045	0.0040	0.0030	0.0020	0.0015	0.0015	0.0010	Accurate unground
	D	0.0060	0.0060	0.0060	0.0060	0.0030	0.0025	0.0025	0.0020	Commercial unground
Accum. spacing error between any two flutes total ind. var.	A	0.0060	0.0060	0.0060	0.0040	0.0030	0.0030	0.0030	0.0025	
	B	0.0100	0.0080	0.0060	0.0060	0.0050	0.0050	0.0050	0.0040	
	C	0.0100	0.0080	0.0060	0.0060	0.0050	0.0050	0.0050	0.0040	Accurate unground
	D	0.0120	0.0120	0.0100	0.0100	0.0080	0.0080	0.0070	0.0060	
Cutting faces radial within total ind. var.	A	0.0030	0.0015	0.0010	0.0008	0.0008	0.0005	0.0005	0.0003	
	B	0.0050	0.0025	0.0015	0.0010	0.0008	0.0007	0.0007	0.0005	
	C	0.0060	0.0025	0.0015	0.0010	0.0008	0.0007	0.0007	0.0006	Accurate unground
	D	0.0100	0.0075	0.0060	0.0040	0.0030	0.0020	0.0020	0.0015	

Control Salt Bath When Heat Treating High-Speed Steel

PART II

By J. G. Morrison
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Landis Machine Co.
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A thin surface film forms on high-speed steels hardened from commercial atmosphere or salt bath furnaces. This should not be confused with decarburization. A thorough bath chemical analysis provides much significant information.

High-speed steels hardened from either commercial atmosphere or commercial salt bath furnaces contain a soft surface film. In properly controlled atmosphere furnaces and adequately rectified salt baths, this film is of the order of 0.0005 in. thick and is not to be confused with decarburization. Some prefer to draw in recirculated air furnaces in order to scale away some of this film, and then remove practically all of it by shot or sand blasting.

This film is not found on sharp corners of tools hardened from commercial atmosphere furnaces because the scaling rate is compensatory to the film depth as found on a broad surface.

The presence of this film is the reason some companies prefer to quench in a salt containing 5 to 20 pct cyanide. In such practice it must be made certain that little or no decarburization is occurring in the superheat, because the carbon and nitrogen introduced into the tool surface on quenching in cyanide will mask this undesirable condition.

It is rather doubtful if a cyanide quench will perfectly compensate surface carbon chemistry as altered in an improperly controlled superheat. The practice of quenching in a bath containing cyanide is beneficial to some tools; to other tools, it may be harmful.

The soft film is the natural reaction, at the tool surface, to oxidizing influences, most obvious as an intergranular attack. This film is so thin that many heat treaters are totally unaware of its existence.

In an experiment conducted some 9 years ago, samples of annealed 18-4-1 steel were polished as for microscopic examination. Specimens were austenitized at 2350°F, some in a commercial atmosphere furnace containing 10 pct CO and others in an open electrode-silica rectified bath. One sample from each furnace was quenched in oil and one sample in a chloride-carbonate bath at 1200°F. Specimens were washed and again polished.

Figs. 11 through 14 inclusive show the surface structure developed on the as-quenched specimens. The already highly oxidized surface etches extremely rapidly. Fig. 11 illustrates the nature of the intergranular attack.

Figs. 15 to 18 inclusive illustrate the normal structure to be found about 0.001 in. below the as-quenched surface after double tempering. A markedly longer etching time in 4 pct Nital is required to develop the structure.

In a test more recently conducted, pre-polished specimens of 18-4-1, type M-2 and type M-1 steels were austenitized at their respective tempera-

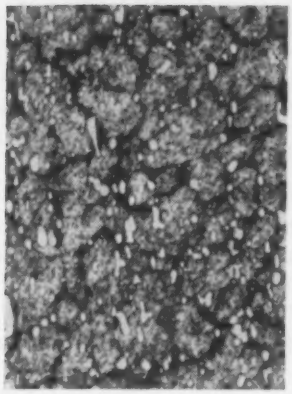


FIG. 11—Surface of prepolished 18-4-1 specimen austenitized 2350°F—open electrode acid $BaCl_2$ bath, oil quenched. Etchant 2 pct Nital. 500X

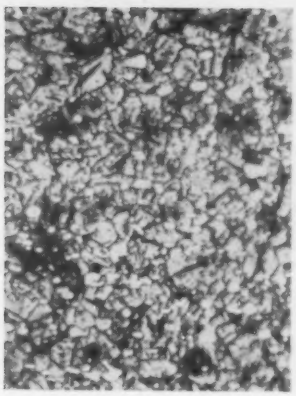


FIG. 12—Same as Fig. 11 except specimen quenched in carbonate-chloride bath at 1200°F—finish cool in air. Etchant 2 pct Nital. 500X

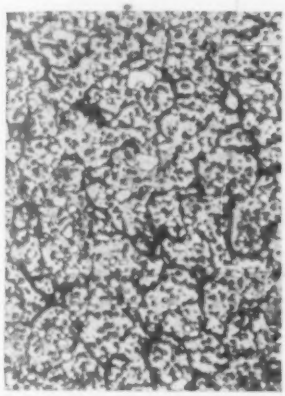


FIG. 13 — Surface of prepolished 18-4-1 specimen austenitized 2350°F from 10 pct Co atmosphere furnace, oil quenched. Etchant 2 pct Nital. 500X

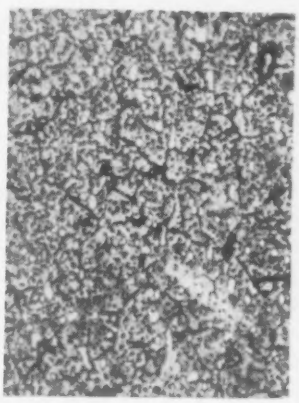


FIG. 14—Same as Fig. 13 except specimen quenched in carbonate-chloride bath at 1200°F, finish cool in air. Etchant 2 pct Nital. 500X

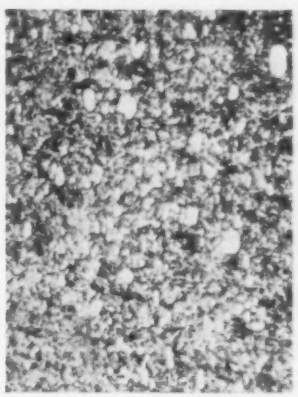


FIG. 15—Same specimen as Fig. 11 after double draw 1080°F, 1¾ hr, 0.0013 in. below surface. Etchant 4 pct Nital. 500X

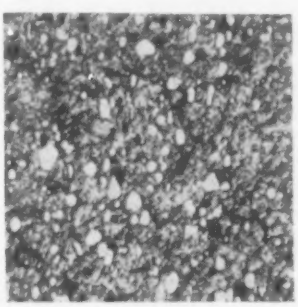
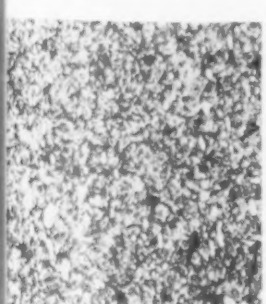
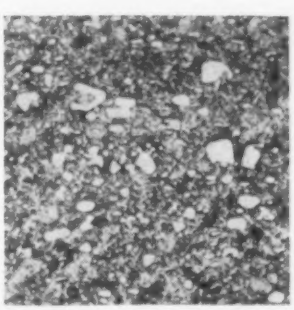


FIG. 16—Same specimen as Fig. 12 after double draw 1080°F, 1¾ hr, 0.0013 in. below surface. Etchant 4 pct Nital. 500X



G. 17—Same specimen as Fig. 13 er double draw 1080°F, 1¾ hr, 0012 in. below surface. Etchant pct Nital. 500X



tures in a submerged electrode, graphite rod—methyl chloride rectified bath. Knoop microhardness numbers were obtained on the as-quenched surface, the same specimens after removing 0.0004 to 0.0006 in. of surface and after copper plating and double drawing at 1025°F for 1¾ hr, then stripping off the copper plate.

Fig. 19 illustrates the hardness numbers at various indenter loads. The as-quenched surface is considerably softer than the surface immediately beneath. The microhardness pattern shows no indication of decarburization, but the soft film is definitely revealed. There is a small increase in the microhardness numbers of the soft film of the several steels with descending austenitizing temperatures. This may not be significant in view of the few specimens tested although a thinner film would be anticipated with the lower oxidation activity at descending austenitizing temperatures.

The chemistry for the submerged electrode-silica rectified high-speed steel superheat bath is complicated. Once a sample of salt is taken

FIG. 18—Same specimen as Fig. 14 after double draw 1080°F 1¾ hr, 0.0010 in. below surface. Etchant 4 pct Nital. 500X

from the molten bath at about 2325°F it is subject to change. Any free barium oxide present in the salt is sensitive to moisture which causes hydration to barium hydroxide. Even the carbon dioxide from the analyst's breath or from a bunsen burner close by will convert the barium hydroxide to barium carbonate. Barium oxide and barium hydroxide are soluble in water, while barium carbonate is only slightly soluble in water.

Little Carbonate In Bath

The ease with which barium oxide is converted to barium carbonate has led to an erroneous assumption that considerable barium carbonate is found in the bath. But if a sample of salt is placed in a flask, 50 pct hydrochloric acid added, and any evolved gas led through a clear solution of barium hydroxide, no evolution of gas occurs when cold. With moderate heating, taking care that the barium hydroxide is not acidified by the HCl vapor, only a trace of carbonate is indicated.

Barium monosilicate, $BaSiO_3$ is present in the bath. With water this forms $BaSiO_3$:6 H_2O, or more probably, BaH_2SiO_4:5 H_2O. The hydrated barium silicate is decomposed by hot water to barium oxide and silicic acid, H SiO, the latter also soluble in water.

For these reasons, the determination for barium oxide as ordinarily carried out, shows the free barium oxide found and also some or all of the barium oxide present in the bath as barium monosilicate. If the total free BaO and that combined as barium monosilicate are to be obtained, washing the water insoluble residue free of any chloride is necessary as is avoidance of any conversion of hydrated barium oxide to the relatively insoluble barium carbonate.

Analysis of a typical bath follows in detail. The bath studied was 50 weeks old and was sampled at 2325°F. First determination was made of the water soluble barium oxide—BaO plus the BaO as barium monosilicate, $BaSiO_3$.

Two 5-g samples were dissolved in warm water. Residue was washed 15 times in cold water. Filtrate was titrated with N/10 hydrochloric acid. Samples 3 and 4 were heated in boiling water. Residue was washed 15 times with hot water. Titrated with N/10 hydrochloric acid.

Barium oxide percentages were found to be: Sample 1—1.84, 2—1.87, 3—1.82 and 4—1.65.

The water insoluble portion or residue was titrated with N/10 hydrochloric acid, and the insoluble barium complexes calculated to BaO. Results, in percent, were: Sample 1—0.56, 2—0.54, 3—0.61, 4—0.75.

As has been found from a great number of tests run over several years, good analytical checks on the calculated barium oxide are obtained only when the barium oxide of the water soluble portion and of the water insoluble portions are added. The percent totals for this bath are: Sample 1—2.40, 2—2.41, 3—2.43, 4—2.40.

The No. 4 sample very probably was exposed to some carbon dioxide, hence the low value of the water soluble portion, the higher value on the water insoluble portion.

The water soluble filtrate, after the above test, was strongly acidified with nitric and concentrated hydrochloric acids, and evaporated to dryness to dehydrate the silicic acid. Then the silica determined to be, in percent silicon dioxide: Sample 1—0.48, 2—0.53, 3—0.58 and 4—0.52. The free barium oxide is determined by subtracting the barium oxide which would be present as barium monosilicate from the calculated barium oxide of the water soluble portion. Thus the free barium oxide in percent, was: Sample 1—0.61, 2—0.52, 3—0.34 and 4—0.32. The agreement is good on the samples heated in boiling water. The small amount of free barium oxide present as compared to the ordinarily calculated barium oxide is striking. A fairly complete analysis of the bath is given in Table II.

The sludge removed from the bottom of the

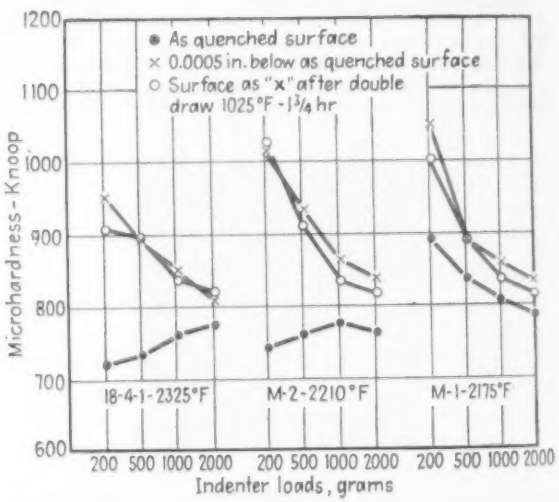


FIG. 19—Comparison of the Knoop microhardness numbers of prepolished surfaces of 18-4-1, type M-2 and Type M-1 high-speed steels treated in salt bath (1) as quenched, (2) after removing 0.0004 to 0.0006 in. from surface, (3) after copper plating, drawing and stripping off plate.

TABLE II

ANALYSIS OF TYPICAL BATH

	Pct
Barium chloride	93.63
BaO (free and combined)	2.42
Chromate, as barium chromate	0.49
SiO_2	1.09
Iron as FeO	0.29
Al_2O_3	0.36
WO_3	0.46
Total	98.74

pot when the bath is at a temperature of about 2325°F is very viscous with a freezing point roughly estimated at 2000°F. When cold it is typically obsidian, being a bright lustrous black glass. The sludge glass is washed, dried, and crushed in a mortar. The analyses of two samples taken several days apart are given in Table III.

The FeO is probably present as iron silicates, $FeSiO_3$, and would account for 12.50 pct of the silica found. The water insoluble barium complex if present as barium disilicate, $BaSi_2O_5$, would require 11.75 pct of the silica found. This would leave about 6 pct free silica. This excess of silica is a circumstance which would be expected. Other silicates of barium which are possible are barium orthosilicate, Ba_2SiO_4, which would require 9.55 pct of the silica found. It appears unlikely that this silicate of barium is formed. Barium trisilicate, $Ba_2Si_3O_8$, would require 25.95 pct silica for its formation, or a total SiO_2 greater than necessary to satisfy it and the iron. The presence of the trisilicate is doubtful.

Experience with methyl chloride rectification has shown that the reduction in the calculated barium oxide to be so slight as to be worthless. Others claim significant reduction of the barium oxide by means of methyl chloride. The failure at Landis to reduce the barium oxide significantly is probably due to the presence of silica derived from the pot refractory, and the resulting low amount of free barium oxide present.

Iron Oxide Is Decarburization Villain

Barium oxide is supposed to be conducive to decarburization. This remains to be proven; at least the amount of free barium oxide present is so small that it appears doubtful. In poorly rectified baths barium chromate may build up and cause excessive decarburization. In the experience of those who harden high-speed steel containing mill scale, there have been periods of almost ruinous decarburization. It is likely that iron oxide is the chief bad actor regarding decarburization. The greatest benefit of the graphite rod-methyl chloride rectification is the efficient reduction of oxides, and removal of the metal as carbide globules on the rods.

Silicate Conversion Lags

In the presence of barium oxide, silica tends to form barium monosilicate. Given an excess of silica, by what appears to be a mass action effect, the barium monosilicate is converted to barium disilicate. It requires, relatively, considerable time for this conversion to take place completely. There is a lag until a fair quantity of sludge is accumulated in the bottom of the pot. Sometimes as much as 2 hr is required for the water insoluble bath content of the barium silicate complex to rise, then decrease as the sludge accumulates.

The barium chloride—silica rectified bath does not, in itself, possess any potential to a carburization. The tendency of the bath can only be toward the decarburizing side. However, the slight carburization that does occur, with adequate silica rectification, is due to the slight oxidation of the surface of the high-speed steel causing a self-carburizing potential with respect to the resultant surface.

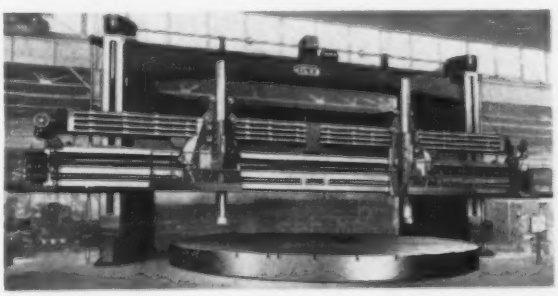
TABLE III

ANALYSIS OF TYPICAL BATH SLUDGE

	Sample No. 1	Sample No. 2
Water soluble barium as entrained $BaCl_2$	2.13	1.68
Water soluble Ba-compounds calculated to BaO (probably entrained)	0.11	0.12
Silica SiO_2	30.04	29.80
Residue after HF-H_2SO_4 volitization of silica—not determined	1.00	1.04
Iron as FeO	14.96	14.88
Water insoluble barium complexes (barium converted to barium sulfate) Calculated to barium oxide BaO	48.80	48.60
Totals	97.04	96.12

Largest Vertical Mill Built for Italy

The largest vertical boring and turning mill ever built in the United States is now being shipped to Turin, Italy, by its manufacturer, Baldwin-Lima-Hamilton Corp., Hamilton, Ohio. The new Niles mill, which will be used to machine parts for water power equipment, weighs 625 tons and has a maximum swing of 43 ft 5 in. Maximum height under tools is 12 ft 2 in. and the total length over the operator's platform at each end of the cross-rail is 65 ft. Overall height is 25 ft and the bed extends 9 ft 6½ in. below the top of the 33-ft-diam table. The table itself has a speed range of 0.125 to 5 rpm. Sixteen mechanical feeds, ranging from 0.01 to 32 mm per revolution of the table, are provided both vertically and at any angle up to 30°. Lubrication of all running parts is automatic and the dc motors are powered by a 150-kw, dc generator driven by a 250-hp ac motor.



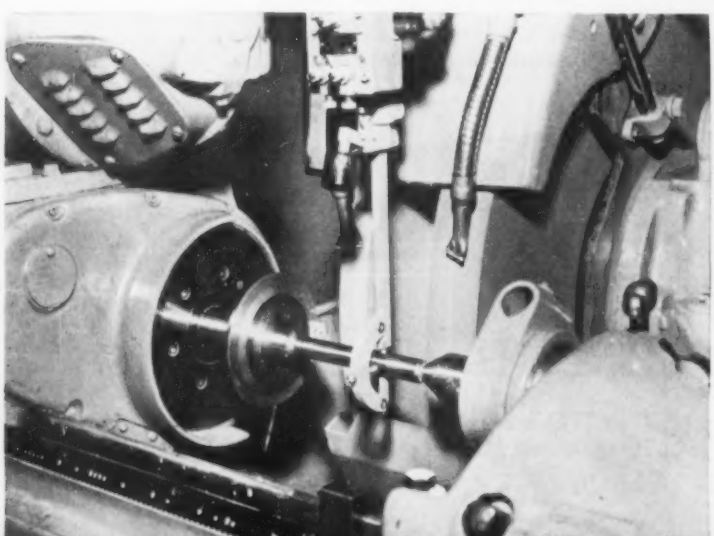
ultra-modern machines make FORD TRANSMISSIONS

Probably no major assembly combines requirements of high output, high precision and low cost to the degree that the automobile automatic transmission does. For this job, Ford's new Cincinnati plant employs a wide variety of the latest and best standard and specially-built machines. Ten representative types are shown here.

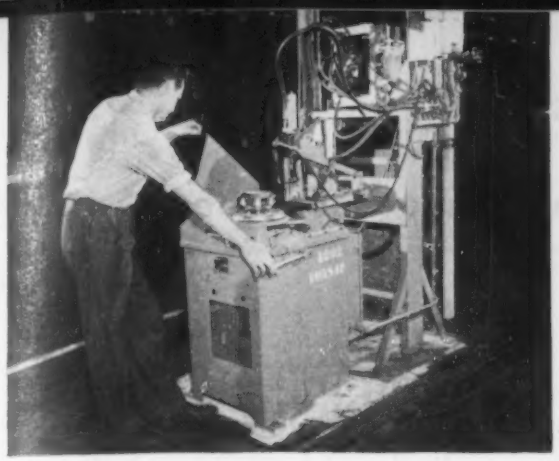
BATTERY OF Ex-Cell-O machines finish the face and bore the pump body pocket of the transmission case.

FRONT OIL PUMP drive's 29 gear teeth are hobbed by this Cleveland hobbing machine.

THREE DIAMETERS of the transmission input shaft are ground on this Cincinnati grinder. A Foster electric gage continuously measures diameter, controls operation.



MOTOR MOUNTING BASE on the transmission housing converter is automatically ground on a Mattison continuous rotary surface grinding machine.



CONVERTER STATORS are balanced on a special General Motors balancing machine. Out-of-balance condition is compensated for by adding weight with Progressive welder.

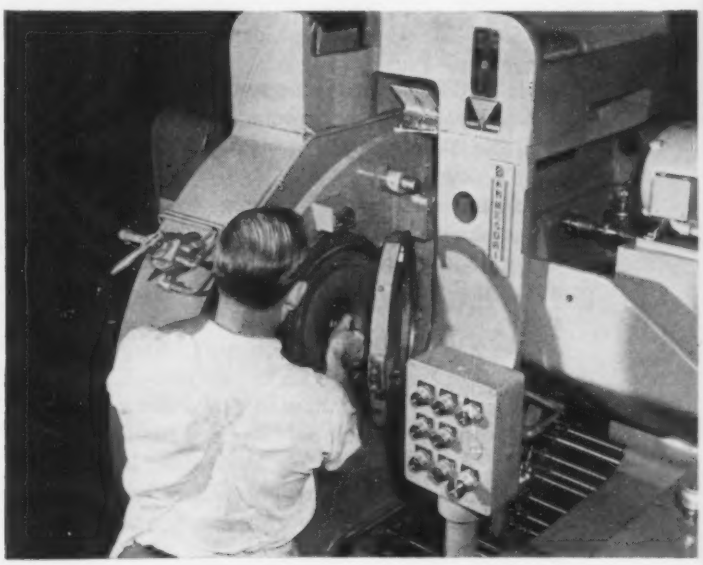
TWO-STATION Hoern & Dilts machine bores, turns ID, and faces both sides of the transmissions gear starting ring. Production rate is about 57 pieces an hour.

CONVERTER STATORS are finished machined on a Gisholt automatic lathe, at a rate of 100 pieces an hour. Outer radii and propeller-shaped surfaces are machined.

CONVERTER STATORS for the transmission have their inside diameter and keyways broached on this American vertical broaching machine.

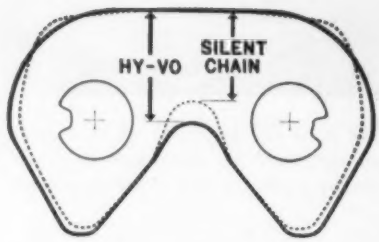
ALUMINUM DIECASTING for housing converter is completely machined by this Hoern & Dilts machine. Boring, grooving and drilling are done on 100 pieces per hour.

A TOTAL of 17 holes are drilled in the Ford automatic transmission cover assembly by this automatic Barnesdril drilling machine.



New high speed chain drive developed

SPROCKET TOOTH profile comparison. Solid line is Hy-Vo sprocket tooth, dotted line is typical silent chain sprocket tooth profile.



CHAIN LINK profile comparison. Solid line is profile of Hy-Vo link, dotted line is profile of a silent chain link.

A newly-developed chain drive makes possible single drive units capable of transmitting as much as 5000 hp at rotative speeds up to 3600 rpm, or linear speeds as high as 6500 fpm. This operation at higher speeds than are practical with conventional chain drives gives the new type of drive greater load carrying capacity. Also, it permits the use of chain drives with higher-speed prime movers.

Developed by the Morse Chain Co. the Hy-Vo chain drive incorporates a new principle of chain and sprocket engagement. In conventional drives, the sprocket is in effect a polygon. The pitch diameter on which the chain rides changes constantly as the chain engages first on a flat side of the polygon, then on a point where two sides join. This chordal action causes vibration and shock which limits the working load and maximum rotative speed of conventional chain drives.

Chordal action has been nearly eliminated in the Hy-Vo drive by a compensating rocking joint between links which shifts the pitch line automatically in such a way that the chain follows a path tangent to the sprocket pitch line. Sprockets for the new drive have curved involute teeth which also contribute to smoother action.

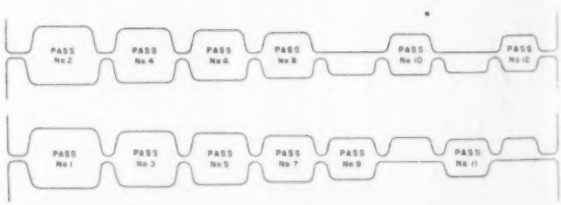
The Hy-Vo drive is reported to run quieter and cooler than other types of chain drives, and to operate with an efficiency of over 99.5 pct.

New roll reduces high-speed steel ingots

REDUCTION of high-speed tool steel ingots to billet form by rolling instead of hammering and forging is practical for the first time with a new cast steel roll.

Since reduction from ingots to billets can be accomplished about five times faster by rolling as by hammering, the roll will help steel mills in obtaining high production of high-speed tool steel.

The roll is cast from a soft, tough coppermoly alloy steel, originally developed for steel castings and later adapted for rolling of dense steels difficult to reduce. The roll needs no water coolant due to the alloy's heat dissipating qualities. Since the cast steel structure will not take a permanent bend, the roll can be used almost continuously.



The alloy does not expand unduly under the rolling temperatures. Therefore it will not "blow up" in the center of the body while remaining comparatively cool at the ends. It is this feature which practically eliminates the breakage common when conventional rolls are used for high-speed steel rolling.

This special alloy was developed, and the roll is manufactured, by the Birdsboro Steel Foundry and Machine Co.

news of industry

PA's Walk Familiar Road of Shortages, Red Tape

They've been battle-hardened and not found lacking in past decade of sellers' market . . . They meet in New York to talk over new campaign vs. scarcity shaping up—*By Bill Packard.*

New York—Purchasing agents are a hardy breed. And they have grown even hardier fighting catch-as-catch-can procurement battles during the past 10 years. Shortages, controls, and red tape are not new to them. They are not inclined to be panicky now because the road they are following is a familiar one.

The impact of government controls on a semi-war economy was the central theme at the 36th annual International Convention of the National Assn. of Purchasing Agents, here this week (June 3 to 6.) Formal sessions echoed with analyses on prices, materials, and economic trends. Corridor gossip centered on hard-to-get items.

Here's how purchasing agents think current business conditions and outlook shape up:

General — Association members report industrial business on the decline. Order backlogs have dropped for the third consecutive month and production is easing off. Defense orders are increasing but aren't felt over a wide area of industry. The immediate future offers gloomy prospects for some manufacturers. Material allocation under CMP is not expected to help much during the third quarter.

Prices—Those under control at least are stabilized. There is confusion as to results of CPR-22, deadline of which has been postponed to July 2. A wave of price relief appeals is expected to hit Washington this summer. Some low-priced, low-profit items may disappear from the market.

Inventories — Industrial stocks continue to become more unbalanced. Third quarter allotments of scarce materials are so unpredictable that PA's have a hard time deciding how much of easier-to-get items to buy for that period.

Buying Policy—Industrial buying is reported by 83 pct of PA's to be within the 90-day spread. There is a definite trend toward 60 and 30-day lead time.

Business Outlook—PA's expect many soft spots to develop during the third quarter. Beyond that the outlook depends on international events and controls.

H. F. Jones, outgoing president of NAPA, urged his fellow buyers to help fight inflation by: (1) Refusing to patronize black markets, (2) avoiding improper hoarding of materials, (3) helping expedite movement of scrap, (4) supporting fully the present program of controls, (5) improving efficiency by doing a better purchasing job.

Other speakers included Earnest T. Weir, chairman National Steel Corp.; George H. Love, president Pittsburgh Consolidation Coal Co.; Burl S. Watson, vice-president Cities Service Oil Co.; Russell C. Wenz, chairman, NAPA committee on nonferrous metals; Carl A. Ilgenfritz, U. S. Steel Co.; Lee R. Forker, Quaker State Oil Refining Corp.; Martin R. Gainsbrugh, chief economist National Industrial Conference Board; Robert C. Swanton, chairman NAPA business survey committee; and George E. Sokolsky. Top government controls officials also spoke.

Coal Pipelines

Pittsburgh — Coal pipelines have been granted public utility status in Ohio.

Under a bill signed by Ohio's Gov. Frank J. Lausche, to become effective Aug. 24, coal pipeline operators will have the right of eminent domain in acquiring property for construction of the lines.

Pittsburgh Consolidation Coal Co. is now building a 12-in. 3-mile-long demonstration coal pipeline near Cadiz, O., the final stage of the company's inquiry into the possibility of moving coal from mine to market in this manner.

Steel mills would be among the first to take advantage of the development due to expected economies over movement by rail.

To Ban Copper Toll Agreements

Washington — Toll agreements between fabricators and owners for processing scrap into unalloyed copper are to be banned, probably by Aug. 1.

NPA is drafting an amendment to M-16 to this effect. It exempts railroads converting box car or journal bearings for their own use. There will be changes in definitions of brass mill products, copper, scrap, and further limitations on inventories and scrap disposal.

Crucible to Expand Facilities

New York—Crucible Steel Co. of America has announced a $900,000 expansion of steelmaking facilities. Addition of an electric furnace and expansion of wire mill facilities will be included.

INDUSTRIAL SHORTS

Expands Division — The Metal Specialties Div. of the CAMBRIDGE WIRE CLOTH CO., Cambridge, Md., will be expanded.

Sale Completed — Herman H. Schwartz of Rochester, N. Y., heading a group of industrialists, has purchased all the outstanding stock of WM. R. THROPP & SONS CO., INC., one of the oldest New Jersey manufacturing corporations. The $1,000,000 cash transaction was arranged by Asset Realization Co.

Ground Broken—A contract has been awarded by the TOP-FLIGHT TOOL CO., INC., York, Pa., for the construction of a new manufacturing plant. Ground was broken recently and occupancy is expected before the end of the year.

New Plant—As a result of urgent demands of the present arms program on many heavy machinery maufacturers, A. HAROLD FRAUENTHAL, INC., Muskegon, Mich., has acquired an 18½-acre tract of land and a new plant of about 10,000 sq ft is under construction.

At Your Service — SKILSAW, INC., manufacturers of portable power tools have opened new factory sales and service branches in Milwaukee, Denver and Spokane.

West Coast Branch—The new West Coast branch office of MAGNAFLUX CORP. is located at 5148 Alcoa Ave., Los Angeles, California. Oregon, Washington, Arizona, Nevada, Utah and Idaho will be serviced by this branch.

Export Activities—The export activities of the Joyce-Cridland Co., of Dayton, Ohio, will be handled by BORG-WARNER INTERNATIONAL CORP. The Joyce-Cridland Co. has been a designer and builder of lifting equipment since 1873.

GE Plant Expansion — GENERAL ELECTRIC CO. has authorized Wigton-Abbott Corp., Plainfield, N. J., to proceed with engineering and construction to prepare additional manufacturing area at the Johnson City, N. Y., plant which it is operating for production under Air Force contracts.

Plant Operation — NATIONAL GYPSUM CO. has contracted with military authorities to operate the Kansas Ordnance Plant at Parsons, Kan., and the Nebraska Ordnance Plant at Wahoo, Neb. Top production experts have been shifted to maintain experienced management at all plants.

Bellevue Moves—The removal of their plant and general offices to 2620 Crane Ave., Detroit, has been announced by BELLEVUE INDUSTRIAL FURNACE CO. This company has been a manufacturer of heat treat and melting industrial furnaces for more than 35 years.

Rockwell Subsidiary—The Ohlen-Bishop Mfg. Co. of Columbus, Ohio, has been acquired by the ROCKWELL MFG. CO.

Increases Facilities—An expansion plan costing $6,000,000, will increase NORTON CO.'s capacity to make grinding and lapping machines. A new 6½-acre plant will be erected in the Greendale section of Worcester.

Continental Construction—Construction has been started on an addition to the Detroit manufacturing plant of CONTINENTAL MOTORS CORP. This will provide greater manufacturing facilities and a new administrative and engineering building.

New Home for Hotpoint—HOTPOINT, INC. has leased approximately 50,000 sq ft of warehouse space at 12100 S. Peoria St., Chicago. All warehousing, shipping, and crating activities are to be moved to the new location.

Report on Business Survival Shows 34 Out of 10,000 Firms Fail

New York—America's economy is rich soil for growth of business and industry. Mortality rate of business last year was only 34 out of every 10,000 and the main reason for failure was the human element. This was indicated in a 16-page booklet, "Survival Qualities of American Business," issued by Dun & Bradstreet.

In one section the booklet reports on an analysis of 9162 business failures in 1950, showing that 96 pct of them were directly traceable to the owners. Pacific Coast business accounted for almost one of every four failures in the U. S. during 1950. In 1940 this area accounted for only 9.7 pct of failures.

A Dun & Bradstreet table shows that the failure rate drops in war and postwar years. Failure rate in 1913 was 100 per 10,000. In 1918 the rate had dropped to 59 and then 37 in 1919. Failure rate in 1940 was 63 per 10,000. By 1945 the rate had sunk to 4 out of every 10,000. It has climbed slowly in the postwar years, standing at 34 last year, still below the prewar rate.

Slag Iron Recovery Up 44 Pct

Washington—Record production of 24.9 million short tons was racked up by the iron blast-furnace slag industry in 1950. Output was valued at $29,480,850, according to the Dept. of Interior. Railroad ballast, cement and other construction accounted for 89 pct of the material used. Processors recovered 296,603 tons of iron, an increase of 44 pct over 1949 figures.

Texas Gas Outlines Expansion

Washington—Plans for a 600-mile expansion of gas pipe lines to serve seven midwestern states and the Appalachian area have been presented to the Federal Power Commission by Texas Gas Transmission Corp. The project would cost $45.3 million.

The additions would permit

Texas Gas to expand daily delivery capacity by 240 million cubic feet to over 900 million cubic feet a day.

Sales plans call for a boost of 145 million feet in the Ohio and Kentucky areas. In addition, 90 million cubic feet a day will be made available to the Tennessee Valley Authority on an interruptible basis to meet needs of Atomic Energy plants at Oak Ridge, Tenn., and Paducah, Ky. Construction could begin within 60 days after FPC approval.

Ohio Works Expansion Completed

Youngstown — The people of Youngstown joined with officials of U. S. Steel Co. here June 7 to celebrate completion of a multimillion dollar expansion program at the company's Ohio Works.

The program resulted in an increase in openhearth capacity of 160,000 tons, and an increase in pig iron capacity of 112,000 tons through the rebuilding and enlarging of openhearth furnaces, No. 5 blast furnace, and installation of two new turbo blowers. An important part of the celebration was the blowing in of No. 5 blast furnace.

Need 30,000 Engineers Per Year

New York—Industry can count on about 19,000 engineering graduates this year, according to the Engineering Manpower Commission. Industry could use 30,000 engineers per year on a peacetime basis, the Commission estimates. The engineer manpower shortage is expected to become more critical in the next 3 years.

Management Discusses Problems

New York—Management got a chance to discuss its problems at a 2-day conference in the Waldorf-Astoria this week, June 7 and 8. Top managers from American business will discuss the economic outlook, organizational problems, employee relationships, wages and prices. The conference is sponsored by the American Management Assn.

MAGNESIUM INDUSTRY—War Growth As Usual

Takes defense load after having won many new civilian markets . . . Reactivated plants to hike output to 250 million lb but no increase seen for civilian products—*By Ted Metaxas.*

New York — Wartime stimulus and Air Force demand is adding the usual emergency period weight to the magnesium industry. It shouldered the defense burden after having successfully wedged itself into the civilian marketplace. Now war needs have bitten deeper into current private production.

More of Production

Trying to maintain as much of a foothold as possible in the commercial market, some civilian users of magnesium will admit that considering the defense pressure they have been fairly well supplied. They'll quickly add that they can use much more of the metal.

Meanwhile, NPA maintains that it seeks to preserve the civilian economy as much as possible. How possible this is with magnesium is debatable. Magnesium gets sudden and voracious demand in wartime. Proportionately more of its production is swung to defense than many other industries.

Magnesium output is starting an upward sprint. Seven emergency plants have been reactivated. Add their later production to Dow Chemical Co.'s private output at its Freeport, Tex., plant and the total is a fat 250 million lb per year plus. But that does not mean that magnesium fabricators will get more of the metal for hard-won civilian lines.

"He's never come right out and *said* it's hot in here—."

Military needs will gather up new magnesium output as it comes in. The government is still intent on stockpiling what's left over. Magnesium foundry capacity is being expanded. Sheet and plate capacity is on the same trend. Dow is installing a privately-financed rolling mill at Madison, Ill. It will have an initial sheet capacity of 16 million lb a year.

Another private magnesium mill of lower capacity may get into production within a year.

Can Use Idle Presses

Dow's Madison plant is expected to add another 3 million lb to extrusion output. Magnesium extrusion capacity alone is now considered inadequate. But it could be boosted quickly if idle presses used for some other metals were shifted to magnesium.

As stated before in THE IRON AGE, Nov. 16, 1950, p. 106, "future of the industry is dependent on the whims of the international situation." It was estimated then that two-thirds of production had gone to war. The percentage has climbed now.

The industry was caught in the World War II whirlwind and annual capacity spurted to 586 million lb. In the postwar era capacity quickly deflated when the U. S. pulled its plants out of the race, while Dow continued its Freeport operations, able to produce 48 million lb a year.

Magnesium men then started a drive to make themselves a per-

manent industry. They moved into the industrial scene with new applications, bucking the competition of cheaper aluminum. Consumption for civilian applications mounted quickly.

With military use still negligible in 1950, the industry used 43 million lb of magnesium. In 1946 only 29 million lb were used. In 1939 still less went to fabricators—6,700,000 lb. This illustrates the field's initiative and growth.

Magnesium men promoted their products more deeply into graphic arts, automotive die castings, extrusions for highway trucks and van trailers, cathodic protection for metals subject to corrosion, materials handling equipment, such as dockboards and hand trucks, and portable tools and equipment.

The industry has had to face aluminum and its benefits from cheaper hydroelectric power. But fabricating facilities are gaining that big-time look and size. Cost-cutting knowledge is increasing. Now magnesium men see themselves as being on the verge of competing cost-wise with other light metals in almost all forms.

Needs Steel—LeTourneau Builds Texas Mill

Will have two 25-ton electric furnaces, plate mill . . . Furnaces are "evolutionary" . . . Rolling mill has new driving principle . . . Consider scrap needs—*By Gene Beaudet.*

Peoria, Ill.—To provide enough steel for its five plants throughout the country, R. G. LeTourneau, Inc., manufacturer of earth-moving equipment, is building a steel mill adjacent to its plant at Longview, Tex.

The mill, which will be in operation before the end of the year, will include two 25-ton electric furnaces, and a plate rolling mill capable of turning out 1000 tons of finished plate per day.

Hampered for some time by the dwindling supply of domestic free steel, the company which uses 500 tons of steel a day in all its plants, had turned to foreign mills to fill out its requirements. However, skyrocketing prices and increasingly slower deliveries, together with the possibility of eventually being cut off from these sources, caused R. G. LeTourneau to take his chances on building his own source of supply.

The initial investment amounting to nearly $1 million will be entirely financed by the company. A certificate of necessity enabling them to write off the mill in 5 years has been granted by NPA.

Steelmaking facilities will be housed in a 100-ft wide and 500-ft long building now under construction. Nearly all of the equipment, such as furnaces, ladles, roller leveler, manipulating equipment and runout tables are being made in LeTourneau plants.

The 25-ton double electric furnace designed by R. G. LeTourneau is described by him as "evolutionary." It is built to heat one charge of scrap red hot with natural gas while the charge ahead of it is being melted down and refined. One furnace has already been built while the other is being completed. Molten steel will be cast into slab ingots, 12 in. x 30 x 84 in. and 15 in. x 36 x 72 in. in size.

DEEP WELD: Pressure vessel fabricated at Carteret, N. J., plant of Forster-Wheeler Corp. takes 3½-in. weld. Welder controls motor-driven rollers which rotate section as weld progresses.

The Largest Rolls

Ingots will be broken down in one operation on the plate mill capable of rolling plate 144-in. wide in thicknesses ranging from 3/16 in. to 12 in. Its rolls will be the largest in the steel industry, the larger being 58 in. diam and the smaller 36 in. Length of the rolls will be 156 in.

A new driving principle developed by Mr. LeTourneau will be incorporated into the rolling mill. It permits the use of a driving motor one hundredth the size of a conventional mill motor of comparable power.

The unit will have a rating of 8000 hp as compared with the largest now in use in any mill of 7000 hp. If proved successful in operation, Mr. LeTourneau predicts it will cause a revolution in the design of rolling mill drives.

Steel Left Over

As things stand now, the company expects to be turning out 250 tons of steel per day in 5 months. When in full operation LeTourneau hopes to make enough steel to fill most of the company's needs and still have some left for sale to Texas' rapidly growing metalworking industry. Ingots now being made in the company's plant in Toccoa, Ga., and rolled elsewhere, may be shipped to the Longview plant for rolling into plate.

At the present time the company has no concrete idea of how much it will cost them to make steel. The major factor is that they need it and this is the way to get it. Additional furnaces and other equipment will be installed depending on how much steel is

needed and the availability of scrap.

Scrap, of course, will be a major problem. Some arrangements for its supply have already been made, but not all. Mr. LeTourneau says that he is just going into the scrap battle and doesn't know as yet how he will come out.

He said that if he doesn't get enough scrap to support his operation that "there is a lot of ore in Texas." While not wishing to elaborate further on this topic at the present time, Mr. LeTourneau conceivably might have in mind the building of a blast furnace in the area.

Will USW Wait for Contract Date to Negotiate?

Industry thinks "yes" . . . Dec. 1 is date for wage talks . . . But when time comes union will want wage hikes, contract improvements . . . Pressure off Murray—*By John Delaney.*

Pittsburgh—Steel labor will not make a move on wages until it can do so under the contract, which sets Dec. 1 as the date for start of negotiations towards a new agreement.

This is the opinion of industry negotiators who naturally have been wondering whether Phil Murray's United Steelworkers (CIO) would ask for an early contract reopening, as happened last year.

For one thing, it was pointed out, the industry is likely to resist strongly any such maneuver by the steel union. For another, Phil Murray is sensitive to criticism on the sanctity of contracts—a point brought out by industry spokesmen last year.

Not So Much Pressure

Also, the economic picture differs this year. When Mr. Murray last year asked the steel companies to sit down with him before they had to under the contract, the powerful United Auto Workers union already had received an increase, Aluminum Co. of America had volunteered a 10 pct boost for its workers, including members of the USW, and the steel workers had not had a base wage rate increase since 1948. All these factors combined to put Mr. Murray under pressure.

Today, the government is struggling to halt increases in the cost of living, and apparently is making some headway. Between Mar. 15 and Apr. 15 the BLS cost-of-living index virtually stood still, and, for the first time since February 1950, food prices declined. So a cost-of-living argument would not carry too much weight, assuming that prices continue to be held in line.

Will Seek Increase

Also, the steel union's last pay increase was about equal to the 10 pct above rates of January 1950 allowable under wage stabilization policy.

When the time comes, however, there is no doubt the USW will ask for a pay increase along with other contract improvements. It is becoming increasingly evident that wage stabilization policies will not be rigid. Also, the UAW and other unions have been getting cost-of-living increases under escalator clauses in their contracts—the most recent being the 3¢-an-hr boost for 335,000 auto workers for the rise in the cost-of-living index since Apr. 15.

Meanwhile, the USW is moving in other ways to obtain more money for its members. One approach is to press for the best possible classification of various jobs. The differential between job classes is 5¢ an hr. Also, the union is more aggressive in putting across its position in the setting up of incentive rates. Some managements are inclined to meet the union more than half way due to the need for sustained production and their reluctance to do anything that might jeopardize operations.

BITS AND BRIEFS

By Bill Packard

General Motors wisely making its wage policy position clear to workers. GM isn't the only company going to bat with WSB for more dough for employees . . . A collapsible, light-weight, jet-powered helicopter will be built for the Army by American Helicopter Co. It operates on ordinary gasoline. Two men can collapse it and load it aboard a jeep . . . New York shoppers having a field day as tempo of retail price war quickens . . . General Electric breaking ground for new $15 million electronics plant at New Hartford, N. Y. . . . **Supreme Court ruling upholding FCC's right to approve CBS color television system doesn't mean the color war is over. RCA will now go after experimental color license. If successful they'll carry fight to public through this medium** . . . Clay P. Bedford, executive vice-president of Kaiser-Frazer Corp., named assistant to Mobilization Director Wilson. His assignment, stimulating defense output . . . Philco Corp. and Chicago Transformer Corp. have come up with new transformer which needs 25 pct less copper and silicon steel. High temperature nylon insulation for magnet wire replaces conventional enamel; coils are insulated with asbestos material instead of organic and paper insulation. Essex Wire makes the magnet wire and du Pont the nylon . . . **United Auto Workers launching organizing drive with goal of a quarter million more members. They have their sights trained on unorganized competing plants, Canadian industries, foundries and expanding aircraft industry** . . . Westinghouse Electric's Transformer Div. at Sharon, Pa., building four 190,000-kva transformers for Detroit Edison Co. They'll be the largest ever built and will cost a total of more than $1 million . . . Norton Co. beginning $6 million expansion

program to boost machine tool output more than 50 pct . . . **French Communists fouled up grand opening of new continuous hot-strip mill at Denain by calling a strike just as visiting officials were ready to board the train from Paris** . . . General Electric chemical officials believe recent development in injection molding presses may make it possible to mass-produce complete plastic refrigerator interiors and kitchen cabinets in one piece.

Plan to Put Freight Cars in CMP Framework

Would be under CMP in third quarter . . . Plan probably started rumors of steel cutbacks . . . NPA sees 690,000 tons as third quarter allocation . . . Output below goal—*By Karl Rannells.*

Washington—Plans were being completed last week for removing the freight car construction program from the special-program category and putting it lock, stock, and barrel under CMP, beginning with the third quarter.

Relief for NPA

Although kept under close wraps, this proposed change-over is the probable basis for recent reports of a cutback of one-third in the freight car program. NPA last week was considering 690,000 tons as the most likely third-quarter allocation figure.

Last-minute efforts to shift the project under CMP is seen as a move partially to ease the headache NPA has had in connection with the sagging, on-again-off-again, freight car program.

Acting on the request of the Defense Transportation Administration, NPA last October took steps to provide enough steel to build freight cars during 1951 at the rate of 10,000 a month.

Beginning with January, the steel industry was ordered to set aside some 310,000 tons of steel a month for the purpose. This was done, with the exception of May when there was a slight reduction.

Through May, some 1,628,000 tons had been allocated. On paper, at least, this would be sufficient to produce some 49,000 new freight cars.

Not Up to Quota

But production reports to NPA showed first quarter production as only 18,802 new cars. Preliminary reports indicated about 8000 in April and a like number in May—a total of 35,000 against a projected 49,000.

Thus, there are theoretically unused allocations despite a lead time of up to 120 days between the steel mills and the completed cars.

Any move or suggestion on the part of NPA to reduce the 310,000-ton-a-month allocation for temporary diversion to other equally-critical uses has met with prompt resistance from car builders, the railroads, and even from Capitol Hill.

Blame Specific Shortages

Under presently announced policy for CMP, unused allocations could not be carried over from quarter to quarter. They must be reported back to NPA for reassignment.

Failure to attain the 10,000-cars-a-month rate has been blamed by the car builders and the railroads on shortages of specific types of steel. Industry spokesmen tell NPA also that "inventories are out of balance" for this reason and it is difficult to get certain components.

NPA last week was checking inventory reports against requests for July allocations of freight-car steel. In the meantime, the agency discarded the certified-order procedure in favor of rated orders for the month of June.

NPA believes that over the coming month inventory shortages can be balanced out. But even under CMP, about 300,000 tons a month is the greatest amount of steel the car builders can expect. Any increase would disrupt present requirement determinations.

April Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

BLAST FURNACE —NET TONS DISTRICTS	Number of Companies	Annual Capacity	PIG IRON April	PIG IRON Year to Date	SPIEGEL, FERRO-MANGANESE April	SPIEGEL, FERRO-MANGANESE Year to Date	TOTAL April	TOTAL Year to Date	Pct of Capacity April	Pct of Capacity To Date
Eastern	12	13,870,660	1,098,048	4,491,146	26,548	108,542	1,124,596	4,599,688	95.5	100.8
Pitts.-Yngstn.	17	27,070,520	2,156,825	8,533,267	26,775	101,247	2,183,600	8,634,514	98.0	97.0
Cleve.-Detroit	6	7,110,600	604,025	2,188,420	.....	.....	604,025	2,188,420	103.2	93.6
Chicago	7	15,684,040	1,264,699	4,797,988	.....	5,694	1,264,699	4,803,682	98.0	93.1
Southern	9	5,310,740	454,787	1,740,014	5,954	37,194	460,741	1,777,198	105.4	101.7
Western	4	3,425,200	250,541	962,485	.....	.....	250,541	962,485	88.9	85.4
Total	38	72,471,760	5,828,925	22,713,320	59,277	252,667	5,888,202	22,965,987	98.7	96.3

STEEL —NET TONS DISTRICTS	Number of Companies	Annual Capacity	TOTAL STEEL (Incl. Alloy Steel, Carbon Ingots) April	TOTAL STEEL Year to Date	Pct of Capacity April	Pct of Capacity To Date	ALLOY STEEL April	ALLOY STEEL Year to Date	CARBON INGOTS April	CARBON INGOTS Year to Date
Eastern	25	20,823,230	1,722,225	6,872,195	100.5	100.3	153,109	550,139	336,665	1,304,012
Pitts.-Yngstn.	34	41,411,870	3,472,612	13,503,465	101.8	99.1	483,746	1,881,197	431,018	1,574,270
Cleve.-Detroit	8	9,601,940	815,788	3,143,585	103.3	99.5	70,593	237,029	99,424	391,203
Chicago	15	21,522,750	1 895,655	7,352,206	107.0	103.9	157,498	583,352	268,009	1,063,688
Southern	9	4,913,340	437,424	1,690,317	108.2	104.6	5,266	20,620	3,765	15,038
Western	11	5,956,520	496,817	1,958,676	101.4	100.0	11,392	42,967	29,010	127,680
Total	81	104,229,650	8,840,521	34,520,444	103.1	100.7	881,604	3,315,304	1,167,891	4,475,891

* Revised.

Thomas Deal Puts Pittsburgh In Strip Derby

Merger of Thomas Steel and Pittsburgh Steel would put company in flat-rolled business fast . . . Thomas specializes in strip steels . . . Merger must wait stockholders' okay.

Pittsburgh—Acquisition of Thomas Steel Co. will put Pittsburgh Steel Co. into the flat-rolled steel business approximately a year ahead of schedule.

Indications are that details of the acquisition will be completed by Aug. 31, whereas Pittsburgh Steel's new 66-in. sheet strip mill will not be in production before July of next year. Thomas is a producer of electrolytically precoated strip steel and other specialty strip steels, uncoated strip, and annealed spring steel.

The boards of directors of the two companies have approved an agreement under which Pittsburgh Steel will acquire Thomas' assets through a stock arrangement.

Under this agreement, each share of Thomas Steel common will be exchanged for 1/3 share of 5½ pct prior preferred stock of Pittsburgh Steel and 1/3 share of Pittsburgh Steel common. Thomas 4¼ pct preferred will be redeemed at the call price of $105 plus accrued dividends.

May Exchange Stock

Thomas preferred stockholders also will be given the chance to exchange their stock for Pittsburgh preferred and common on the basis of 8/10 share of 5½ pct prior preferred and 1¾ shares of common for each share of Thomas preferred.

The agreement is subject to approval of the common stockholders of Thomas and various other conditions including favorable ruling on tax questions.

Thomas Steel, with nearly 900 employees, shipped 77,030 tons of finished steel last year. Sales were $14,707,266 and net earnings were $1,649,473. The company spent $1,097,774 on expansion during the year, including a new high-speed 3-stand cold-reducing mill which went into operation Sept. 15. Rolling capacity was increased from 7000 to 10,000 tons per month.

E. Milton Barber, president of Thomas Steel, was appointed executive vice-president and a director of Pittsburgh Steel.

Monster Milling Machine To Make Skins for F-94 Jet Fighters

Schenectady—A monster milling machine 80 ft in length and weighing 200 tons will turn out integrally stiffened skins for F-94 jet fighters. General Electric Co. and Giddings & Lewis Machine Tool Co. have teamed up to make the machine for Lockheed Aircraft Corp. (See picture below.)

The complex, 3-dimensional milling machine will turn out self-reinforced skins for modern sonic-speed planes.

Use of the new skins will reduce the number of parts and attachments used in planes and will cut handling expenses and assembly time. Ribbed skins will replace the usual forest of struts, braces and girders welded or riveted within the plane.

The machine, to be known as the Giddings & Lewis Hypro Aircraft Skin Mill, will operate in three dimensions with two feed motions. Some 12 drive motors totaling 350 hp, plus 18 other motors and generators, will be used to deliver power. The 100-ton capacity table will be driven by a 20-hp motor.

Integral-rib skin panels will be milled from solid or rough-forged aluminum alloy plate. A GE electronic tracer control will be used to guide longitudinal and lateral cutting motions simultaneously.

Speed steering controls are combined for ease of operation. A catwalk will give the operator a better view of work in progress.

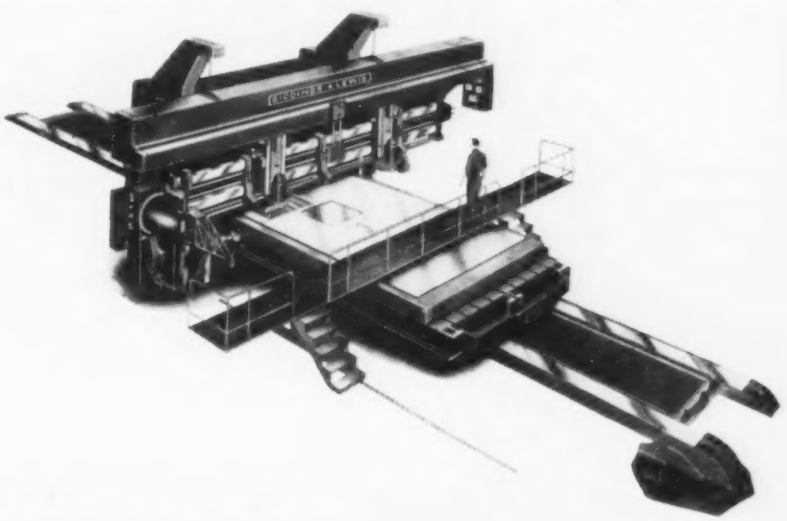
The machine, when completed, will become part of Lockheed's new $5 million "Hall of Giants" fabricating building at Burbank, Calif.

NPA Steel Gets New Chief

Washington—Richard F. Sentner of U. S. Steel Co. has been named director of the Iron and Steel Div. of the National Production Authority. He replaces Melvin W. Cole, who has returned to Detroit to take up his duties with Bethlehem Steel Co.

Wins Gear Assn. Connell Award

Pittsburgh—Edward W. Miller, president of the Fellows Gear Shaper Co., has been awarded the 1951 Connell Award for development of sound principles in gear engineering.



Consumer Durables Held to 70 Pct of Base

NPA's M-47 affects most consumer durables in third quarter . . . Automobiles under their own steel order . . . NPA warns it will check tendency to favor high-price items over low.

Washington—Effective July 1, M-47 will limit the use of iron and steel for manufacture of most consumer durables during the third quarter to 70 pct of base period rates.

Either the first-half 1950 or the last-half 1949 may be adopted by the manufacturer as the base period.

Automobiles have been removed from the consumer durable list covered by M-47. Use of steel in their production is covered by a separate order.

Consumer Durables Affected

Among consumer durables affected by the revision are household and office furniture, stoves and refrigerators, toys, lawnmowers, radios and TV sets, and other goods used in everyday living.

In revising the order, NPA warned that it would check on trends to increase the ratio of high-priced items to the low-priced ones. NPA has the power and would act to prevent such production changes.

Exempt from the 70 pct limitation are small users of carbon steel—those whose third quarter output will contain less than five tons of steel.

Permitted 90 Pct of Base

In addition, users of 100 short tons or less for the quarter will not be held to the 70 pct limitation but will be permitted 90 pct of the base period instead.

Assemblers who purchase parts for assembly of a finished item are permitted to operate under one of the following options:

(a) 70 pct of the number of parts used during the base period quarters; 70 pct of the average quarterly number of finished units assembled; or, 70 pct by weight of the iron and steel content of the purchased parts.

In a minor revision, some related items are regrouped under one heading in List A. Also, a few others have been added to the list including dehumidifiers for home use; attic, window-ventilating and kitchen exhaust fans; and portable electric water heaters.

NPA's M-68 to Limit Third Quarter Auto Output to 1,200,000

Washington — NPA's copper, aluminum, and steel cuts for the third quarter 1951 will hold output of passenger cars to 1,200,000 units, for a 37 pct cut from the like quarter of 1950. Production in the current quarter is expected to be 1,400,000 cars. Total output for the year is expected by NPA to be 5,400,000 cars against the peak 6,500,000 last year.

More Lighter Cars

NPA's order M-68, setting the new controls formula, allows producers a certain flexibility. By turning more production to lighter cars, more units can be produced with available materials.

To maintain the competitive balance among auto manufacturers, M-68 allots specific percentages of the overall total of units to individual firms. Percentages are: General Motors, 41.35; Chrysler, 21.65; Ford, 21.35; Studebaker, 4.25; Nash, 3.30; Hudson, 2.95; Packard, 2.15; Kaiser-Frazer, 1.55; Willys-Overland, 1.00; Crosley, 0.35; and Checker Cab, 0.10.

Set Molybdenum Ore Export Quota

Washington—An export quota of 1,250,000 lb (contained) molybdenum ores and concentrates has been set for second quarter 1951 by the Office of International Trade.

A quota of 195,000 lb of ferromolybdenum and molybdenum metals was also set. Since second quarter licenses will be good for 6 months, only 700,000 lb of ores and 100,000 lb of metal will be permitted from May and June production with the remainder to be scheduled from third quarter production.

NPA Ups Aluminum Wool Use

Washington—Changes in M-7 last week increased use of aluminum for aluminum wool for aircraft maintenance and automobile air filters from 50 pct to 65 pct of base period consumption.

Another revision exempted retail assembly of parts for seasonal items, chiefly awnings, which had previously been held to the 50 pct level.

Industry Controls This Week:

NPA Orders

M-7, Aluminum wool—Amendment raises permitted use for aircraft maintenance, auto filters.

M-7, Retail assembly—Exempts retail assembly of parts for seasonal items.

M-9, Zinc set-asides — Producers must set aside 20 pct of anticipated monthly production for defense rated orders.

M-15, Zinc use — Amendment restricts use of high-grade slab zinc, zinc alloys; restricts inventories. Amended May 28, 1951.

M-20, Steel scrap—Amends order to make use of rails and axels subject to provisions of M-64. Amended May 28, 1951.

M-25, Tinplate — Amendment provides adequate supplies of tinplate for cans holding less than 5 gal powdered whole milk. Amended May 31, 1951.

M-38, Lead — Acceptances of DO-rated orders raised from 20 to 25 pct of monthly production. Refiners must set-aside 5 pct for "hardship" cases. Effective May 28, 1951.

M-47, Iron, steel use—Lifts restric-

tions on use in seats and desks for schools. Amended May 20, 1951.

M-47, Iron, steel use—Limits use of iron, steel for most consumer durables in third quarter to 70 pct of base period rates. Effective July 1.

M-66, Graphite products — Established inventory control over graphite products and electrodes.

M-68, cuts steel, copper, aluminum to auto industry, limits third quarter output to 1,200,000 passenger cars. Effective July 1, 1951.

M-69, Sulfur—Limits use to 100 pct of 1950, controls inventory, requires authorization for some shipments. Effective June 4, 1951.

Del.-13, Oil storage steel — Gives Petroleum Administration for Defense permission to channel steel into construction of facilities for winter storage of more than 3 million gallons of fuels and petroleum products.

OPS Orders

CPR 31, Amend. 2, Imports—Extends deadline for filing of price data from June 1 to June 15. Effective May 29, 1951.

CPR-43, Zinc scrap prices — Sets ceiling prices substantially below prevailing market prices. Effective June 6, 1951.

GOR-3, Amend. 1, Rubber — Exempts from price control experimental rubber products until sales exceed $1,000. Effective June 2, 1951.

GCPR, SR 33—Nickel price — Authorizes price increases in products containing more than 5 pct nickel. Effective June 2, 1951.

SFO Order

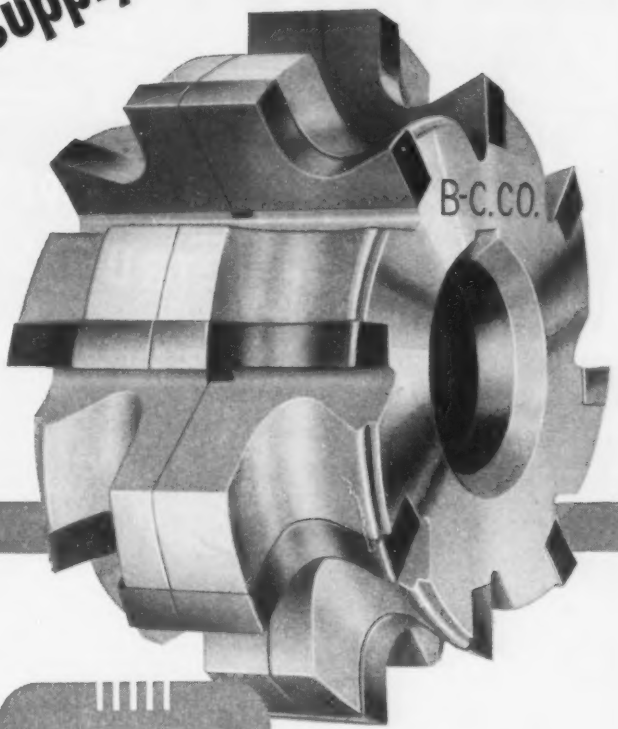
SFO-1, Filing date—Extends deadline for filing DSFA-1 to June 30.

Tighten Graphite Controls

Washington—Operators of electric furnaces must file third-quarter needs for artificial graphite products and carbon electrodes with NPA by June 10.

These products go under allocation July 1, except for users of less than 500 lb per quarter and graphite electrodes of less than one inch. In the meantime, NPA has issued M-66, which places in-

you supply the form...



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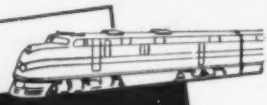
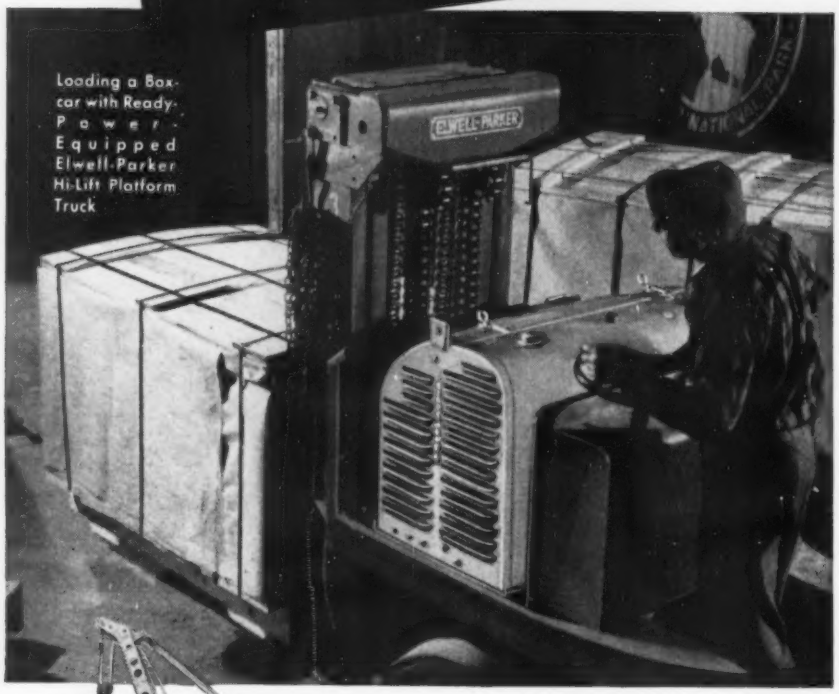


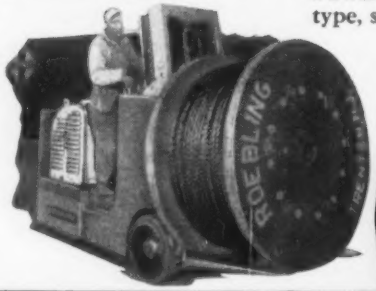
Diesel-Electric Locomotives

READY-POWER-equipped ELECTRIC-TRUCKS

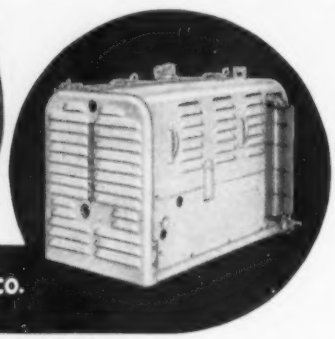


Loading a Box-car with Ready-Power-Equipped Elwell-Parker Hi-Lift Platform Truck

Yale Crane Truck Equipped with Ready Power



Ready-Power-Equipped Automatic Fork Truck



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Controls Digest

Continued

ventory control over these products.

Under the order, these items are generally limited to 4-week levels, except west of the Mississippi where pool car buyers are permitted 8-week levels. Artificial graphite anodes may be stocked up to 20-week levels.

Place Close Limits on Used Rails, Axles to Avoid Speculation

Washington—NPA has formalized an earlier directive by issuing a new order (M-64) which restricts sale and delivery of used rails and axles to prevent speculation and diversion.

Limitations are: (1) After May 31, no deliveries or acceptance of re-rolling or scrap grades in amounts of 10 or more tons may be made without written NPA authorization; (2) NPA will allocate and specifically authorize quantities for specific uses; (3) all railroads are placed under a mandatory reporting system.

At the same time, NPA amended the scrap inventory order, M-20, making used rails and axles also subject to the provisions of Order M-64.

Used rail and axle inventories have been reported to NPA as down to a critical level as foundry and forging needs increase.

NPA Readies M-50 Amendment For Some Electrical Requirements

Washington — NPA last week was drafting an amendment to M-50 which would establish quotas of steel, copper, and aluminum to be made available during the third quarter for minor electrical power requirements.

An amendment to M-4 was also being prepared which would partly remove electric utilities from the 25-ton restriction for construction.

NPA said third-quarter steel quotas would probably be limited to 18¾ pct of the amount used by each company during 1950. An alternative would be 75 pct of the amount used during the corresponding quarter last year.

To Prime Contractors

If you have parts you want to subcontract, THE IRON AGE would like to illustrate them, along with brief specifications, to help you find subcontractors. Simply mail a photo or sketch of the part, with a few notes on size, tolerances, heat treatment, etc., to "Can You Make It" Editor, The Iron Age, 100 East 42nd St., New York 17, N. Y. There is no charge for this service.

Sorry, but we cannot attempt to compile or list the facilities of companies looking for subcontracts.

Munitions Board Prepares New Contract-Termination Rules

Washington — New government procurement regulations relating to contract-termination provisions are now in the "final draft" stage.

The Munitions Board and the Defense Dept. are putting the final touches on new rules which will appear as Section 8 of the Armed Services Procurement Regulations.

Final approval by the Board is expected in a few weeks.

DEFENSE CONTRACTS

Week of June 4, 1951

Gages—Century Tool Co., Philadelphia
Honing machine—Vapor Blast Mfg Co., Milwaukee
Trimming press—E. W. Bliss Co., Canton, Ohio
Gage—Scovill Mfg. Co., Inc., Brooklyn, N. Y.
Machines, sawing—Motch & Merryweather Machy. Co., Cleveland
Press, hydraulic—A. B. Farquhar Co., York, Pa.
Radio set—Western Electric Co., Inc., New York
Motor generator—Homelite Port Chester, N. Y.
Receiving set—Radiomarine Corp. of America, New York
Radio set—Utility Electronics Corp., Newark, N. J.
Slitter and rewind machine—Cameron Machine Co., Brooklyn
Machine, grinder—Gallmeyer & Livingston Co., Grand Rapids, Mich.
Trailers—Fruehauf Trailer Co., Detroit
Tractor—International Harvester, Melrose Park, Ill.
Cranes—Michigan Power Shovel Co., Benton Harbor, Mich.
Trailers—Trailmobile Co., Cincinnati
Sawmills—American Sawmill Machy. Co., Hackettstown, N. J.
Winches, electric—Jaeger Machine Co., Columbus, Ohio

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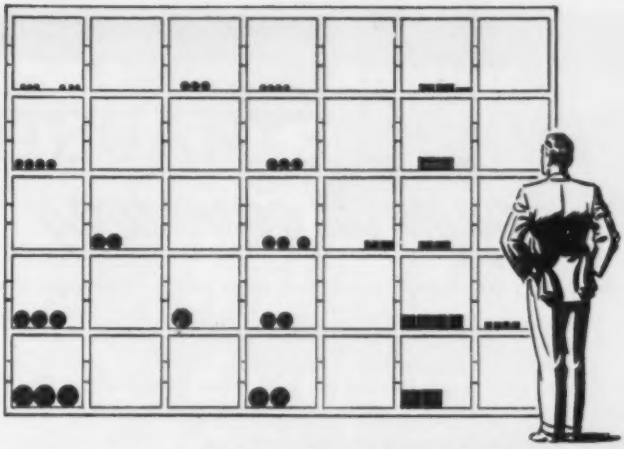

The present serious **STEEL SHORTAGE** has reduced our warehouse stocks of HY-TEN and Standard alloy steels to a sub-normal level.

This inventory situation is, of course, very unsatisfactory but we are doing everything we possibly can to improve it.

Our aim is to allocate available stocks to our customers in the fairest and most equitable way possible.

Defense certifications on your warehouse orders will aid us greatly in supplying your alloy steel needs.

In the light of current conditions, we suggest that you put our metallurgical knowledge and experience to work for you.

It frequently happens that, when certain exact specifications are not available, our metallurgists can recommend entirely suitable substitute materials or alternate methods of manufacture and treatment.

Your nearby Wheelock, Lovejoy representative knows metallurgy. He stands ready to give you expert assistance in solving your problems.

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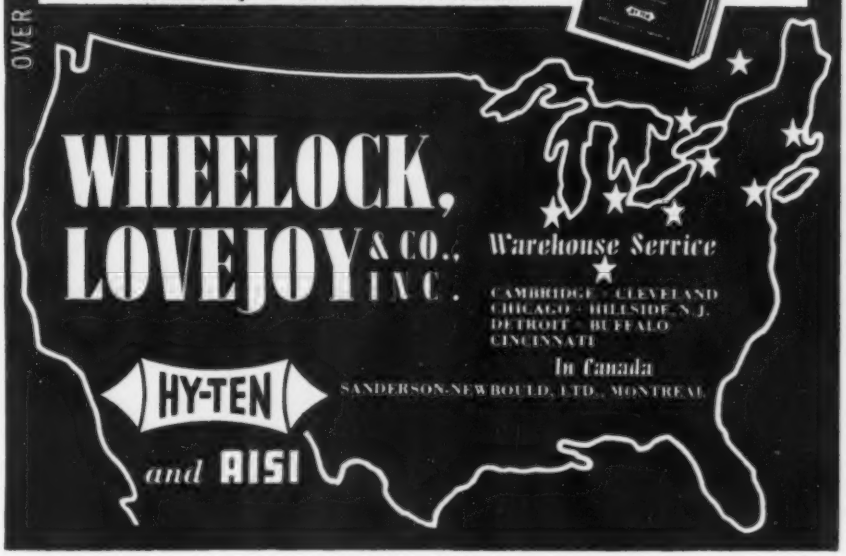

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Warehouse Service

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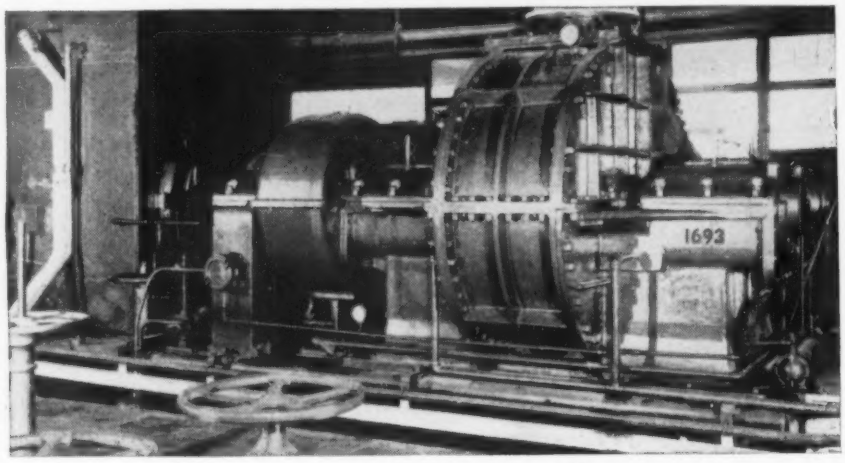
NEW R·C EXHAUSTER
pays its own way

By replacing a 30-year-old battery of three steam-driven gas exhausters with a new, high-capacity, electrically-driven R-C unit, important advantages were gained, in a large industrial plant:

1. **The one new unit carries the base load.**
2. **Steam needed for 5 other steam-driven exhausters, carrying partial load, is substantially reduced because of slower speeds.**
3. **Heat balance in the plant is maintained.**
4. **Savings in total power cost will pay for the new installation in about one year.**

These very satisfactory results were obtained by careful evaluation of all the factors before deciding upon the type of equipment . . . and then by specifying an R-C Rotary Positive Gas Exhauster that will do the work at low operating cost.



Type RCGH Rotary Positive Gas Exhauster, driven by 450 hp synchronous motor. Capacity, 20,600 cfm.

Even though your equipment to handle gas or air may still have years of life, it may be sound economy to replace it with modern, efficient, R-C units of the right type, size and drives to best meet your needs. Our engineers will help you analyze your problem and make unbiased recommendations of either Rotary Positive or Centrifugal equipment, depending upon your specific conditions. This *dual choice* is an exclusive R-C advantage.

With capacities from 5 cfm to 100,000 cfm, R-C units can be closely matched to work requirements, for dependable, economical performance. At Roots-Connersville, almost a century of blower building experience is at your service, without obligation.

ROOTS-CONNERSVILLE BLOWER CORP.
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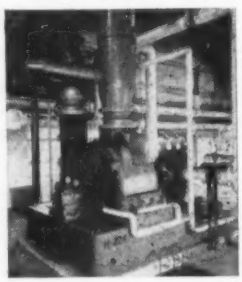

2-stage Centrifugal Exhauster for coke oven plant of Canadian steel mill. Capacity 16,340 cfm.

ROOTS-CONNERSVILLE
BLOWER BUILDERS R.C. SINCE 1854
ONE OF THE DRESSER INDUSTRIES

Controls Digest

Continued

Sonar transducers—Massa Laboratories, Inc., Hingham, Mass.
Audio oscillator—Hewlet-Packard Co., Palo Alto, Calif.
Telescopes—American Gystoscope Makers, Inc., New York
Valves—Walworth Co., New York
Antenna assy—N.S.T. Corp., Philadelphia
Antenna assy—Jetronic Industries Inc., Philadelphia
Saw, contour—DoAll Philadelphia Co., Philadelphia
Regulators—Westinghouse Electric Corp., Dayton
Exhaust valves—Harold Benedict Co., Detroit
Radio receiver—The Stamford Electronics Co., Stamford, Connecticut
Shackle assy—Thomas A. Edison, Inc., West Orange, N. J.
Attentuator—Electron-Radar Products Co., Clifton Heights, Pa.
Propeller balancer assy—The Marvel Mfg. Co., Caldwell, N. J.
Bomb dolly—The Waco Aircraft Co., Troy, Ohio
Recorder—Minneapolis-Honeywell Regulator Co., Minneapolis
Air ducts—Arrowhead Rubber Co., Downey, Calif.
Air ducts—United States Rubber Co., New York
Aircraft parts—Durham Aircraft Service, Inc., Woodside, N. J.
Engine parts—Kindred Aviation Corp., Burbank, Calif.
Machine tools—The National Acme Co., Cleveland
Steam drop hammers—Erie Foundry Co., Erie, Pa.
Radial drills—The Fosdick Machine Tool Co., Cincinnati
Radial drilling machines—The Cincinnati Bickford Tool Co., Cincinnati
Machine tools—The Carlton Machine Tool Co., Cincinnati
Drilling machines—The Baush Machine Tools, Springfield, Mass.
Keller machines—Niles-Bement-Pond, Pratt-Whitney Div., West Hartford, Conn.
Generator assy—Beech Aircraft Corp., Wichita
Pressure gage—U. S. Gauge Div., Amer. Machine & Metals, Inc., Sellersville, Pa.
Amplifiers—General Electric Co, Syracuse, N. Y.
Transmitter—Eclipse - Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Oscilloscope—Television Equipment Corp., New York
Fuel injection systems—Ford Motor Co., Dearborn, Mich.
Receiver-transmitter—Collins Radio Co., Cedar Rapids, Iowa
Tuning assy—Bendix Aviation Corp., Teterboro, N. J.
Carburetor assys—Bendix Products Div., South Bend, Ind.
Machine tools—Heald Machine Co., Worcester, Mass.
Machine tools—Norton Co., Worcester, Mass.
Machy, equipment—Nash-Kelvinator Corp., Detroit
Machy, equipment—Kearney & Trecker Corp., Milwaukee
Boring machines—Ex-Cello Corp., Detroit
Special tooling—Perkin-Elmer Corp., Glenbrook, Conn.
Automatic lathes—The Cleveland Automatic Machine Co., Cincinnati
Grinding machines—The Thompson Grinder Co., Springfield, Ohio
Engine lathes—The Monarch Machine Tool Co., Sidney, Ohio
Drill press—Buffalo Forge Co., Buffalo
Milling, centering machine—Sundstrand Machine Tool Co., Rockford, Ill.
Indicators—Kollsman Instr. Corp., Elmhurst, N. Y.

Baldwin Gets Turbine Contract

Philadelphia—Four 35,000 hp hydraulic turbines, among the largest ever produced in this country, will be built by Baldwin-Lima-Hamilton Corp. The units will be installed in the Old Hickory Plant, Cumberland River, Tenn.

DPA Moves to Clear Backlog Of Fast Tax Write-Off Requests

Will consider only "urgent" cases filed after June 15 . . . 7081 pending

Washington — DPA said this week it would not consider—except in certain cases—applications for fast tax write-offs filed after June 15 until its present backlog is cleaned up.

Only "urgent" cases will be considered until pending applications have been disposed of, the agency warned. NPA—the recipient agency—will continue to receive applications, however.

DPA's score to date: 9153 received, 1570 approved, 7081 still in hands of delegate agencies, 502 denied.

Some of the approvals granted in the period May 18 to 25, listed by company, product or service, amount applied for, amount eligible, and percent certified are:

Cornwall R.R. Co., transportation, $394,000, $394,000, 65.

Youngstown Sheet & Tube Co., steel, $839,000, $839,000, 60.

Pennsylvania R.R. Co., transportation, $5,536,900, $5,536,900, 80.

Owensboro Forging Co., forgings, $69,089, $58,139, 75.

Bliss & Laughlin, Inc., steel, $414,300, $414,300, 60.

Republic Steel Corp., stainless tubing, $105,000, $105,000, 60.

Alabama Great Southern R.R. Co., transportation, $154,161, $154,161, 65.

Dixie Carriers, Inc., transportation, $43,783, $40,283, 70.

Texas Barge Line, Inc., transportation, $277,000, $277,000, 80.

Berg Metals Co., scrap steel, $25,471, $25,471, 75.

Reading Co., transportation, $4,860,365, $344,612, 65.

Texas & Pacific R.R. Co., transportation $5,383,162, $5,383,162, 65.

Lukens Steel Co., steel plate, $599,000, $599,000, 60.

Missouri-Kansas-Texas R.R. Co., transportation, $6,775,406, $6,775,406, 80.

Berman Bros. Steel Corp., scrap steel, $90,000, $60,000, 75.

Judson Steel Corp., steel bars, $4,622,149, $4,622,149, 65.

Southern Hide, Wool & Junk Co., scrap metal, $20,000, $17,500, 75.

Pennsylvania R.R. Co., transportation: $2,500,000, $2,500,000, 80; $2,918,500, $2,918,500, 80.

Pittsburgh & Lake Erie R.R. Co., transportation, $5,220,000, $5,220,000, 80.

Thomas L. Farrington Hensie Towing Co., transportation, $120,000, $120,000, 80.

Parker-Majestic, Inc., bearings, $36,687, $36,687, 90.

Alton & Southern R.R. Co., transportation, $142,380, $142,380, 65.

New Mexico Asphalt & Refining Co., fuel oil, $1,957,000, $1,957,000, 75.

Production Steel Strip Corp., processing metals, $1,301,000, $1,301,000, 60.

American Steel & Wire Co. of New Jersey, wire, $89,361, $89,361, 60.

Transicoil Corp., servo motors, $137,285, $137,285, 90.

Great Lakes Steel Corp., cold rolled sheets, $2,736,500, $2,736,500, 60.

Another

ARCOS

development in

LOW HYDROGEN ELECTRODES

The TENSILEND Series

You'll be dollars ahead if you put ARCOS' specialized experience in high tensile welding to work on your jobs. ARCOS has pioneered in the development of low hydrogen electrodes and now offers its Tensilend series to supplement its Manganend and Nickend grades. This now makes available the most complete line of low hydrogen electrodes with the widest range of applications in the high tensile field.

Special stainless type coatings; baking and packing to reduce moisture absorption after delivery; and other rigid quality controls assure you of "high-test" performance in the shop and in the field. There's no need for preheating (even in heavy sections) and underbead cracking has been eliminated. If you run up against any problems in welding high strength steels, we'll be glad to give any help we can.

ARCOS CORPORATION
1500 South 50th St., Philadelphia 43, Pa.

The ABC'S of Welding High Tensile Steels

Write for "The ABC's of Welding High Tensile Steels" for helpful, technically accurate, but easy-to-read information that shows the way to better welding results.

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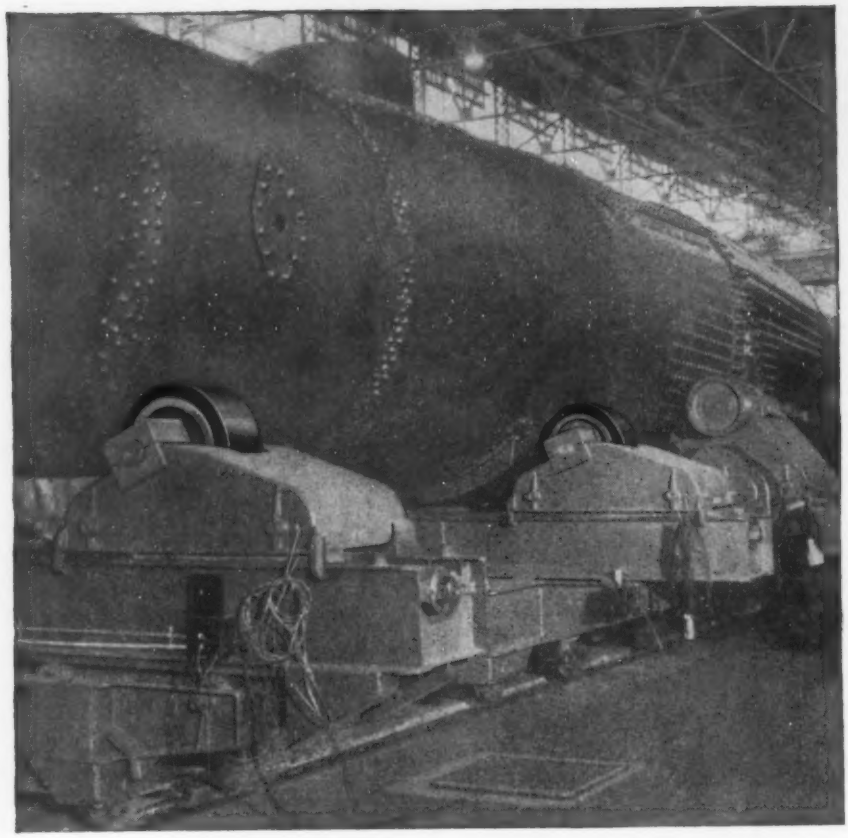
Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes



...it's rotated by rubber covered rolls

YES, this huge locomotive boiler is cradled on powerful Continental rubber covered rolls. These power driven rolls rotate the boiler slowly so that the seams can be welded continuously. It's a punishing assignment . . . an assignment that demands skill and precision during every step of the roll-building process.

The successful production of these rubber covered rolls is an example of the service offered by Continental . . . service that is based upon long experience in building rolls for steel mills, corrugated box manufacturers, paper mills, tanneries, glass plants, and many other industries.

Why not get acquainted *now* with Continental roll covering service? Our representative will be glad to discuss your requirements with you.

WRITE FOR OUR ENGINEERING HANDBOOK ON RUBBER COVERED ROLLS

MANUFACTURERS SINCE 1903

CONTINENTAL

RUBBER WORKS

1985 LIBERTY STREET • ERIE 6, PENNSYLVANIA

• News of Industry •

Sangamo Electric Co., ordnance, $463,903, $463,903, 80.

Republic Steel Corp., coal, $1,150,000, $1,150,000, 50.

Monsanto Chemical Co., styrene monomer, $8,600,000, $8,600,000, 70.

Dow Chemical Co., styrene, $1,610,000, $1,610,000, 70.

Prevost Forged Products, ordnance, $5,037, $5,037, 90.

Federal Aircraft Works, aircraft skis, $56,107, $47,296, 80.

S. Wilkoff & Sons Co., scrap iron, $40,001, $40,001, 75.

Elgin National Watch Co., clocks, $40,000, $40,000, 75.

R. H. Bouligny, Inc., machining of metals, $175,000, $175,000, 80.

Stewart-Warner Corp., electronic equipment, $1,075,000, $958,600, 75.

Olin Industries, Inc., cellulose, $17,439,000, $17,439,000, 65.

B. F. Goodrich Co., track blocks, $348,270, $348,270, 60.

Barry Co., shock absorbers, $76,703, $76,703, 80.

Hill-Chase Steel Co. of Md., distribution of steel, $334,000, $334,000, 60.

Great Lakes Steel Corp., studs (steel), $134,286, $134,286, 60.

Koppers Co., Inc., styrene monomer, $3,691,000, $3,691,000, 70.

Bendix Avintion Corp., research engineering, $34,791, $24,463, 75.

Pennsylvania Smelting & Refining Co., pig lead, $241,750, $223,000, 75.

American Steel & Wire Co. of N. J., steel wire, $32,272, $30,082, 60.

R. H. Bouligny, Inc., metal machining, $34,480, $34,480, 80.

Wanakoneta Machine Co., machine knives, $360,700, $342,700, 80.

F. W. Sickles Co., transformers, coils, $393,500, $386,750, 75.

Louisville & Nashville R.R. Co., transportation, $3,253, $3,253, 65.

Phoenix Mfg. Co., washers, connectors, $229,463, $158,463, 60.

Union Wire Rope Corp., steel wire, $414,450, $394,450, 60.

Rayonier, Inc., cellulose, $2,985,535, $2,985,535, 65.

Plane Parts, Inc., airplane parts, $42,450, $42,450, 85.

Craig Machine, Inc., prefabricated shelters, $12,500, $11,000, 75.

Aermotive Equipment Corp., control panels, $5,000, $5,000, 85.

Arma Corp., instruments, $173,718, $173,718, 80.

Superior Tube Co., metal tubing, $2,373,215, $2,331,125, 60.

Bendix Aviation Corp., ordnance, $184,119, $184,119, 75.

National Tube Co., steel tubular products, $4,348,092, $4,132,722, 60.

American Steel & Wire Co. of N. J., wire products, $193,125, $193,125, 60.

Hotchkiss Tool & Engr. Co., tools, dies, $20,938, $20,938, 90.

Wellsville Fire Brick Co., heat brick, $373,352, $319,657, 85.

Shell Oil Co., toluene, $150,000, $150,000, 100.

Crucible Steel Co. of America, steel, $138,039, $115,033, 65.

Carrier Corp., tank hulls, $1,118,032, $1,118,032, 75.

New England Metallurgical Corp., heat treating-metals, $68,000, $68,000, 60.

Koppers Co., Inc., styrene monomer, $320,267, $320,267, 70.

Dow Chemical Co., methyl styrene, $10,241,400, $10,241,000, 60.

National Gypsum Co., test stacks, $91,424, $91,424, 75.

Gits Bros. Mfg. Co., shaft seals, $4,633, $4,633, 90.

Wichita Precision Tool Co., Inc., screw machine parts, $45,435, $43,262, 90.

Bundy Tubing Co., ordnance, $160,602, $160,602, 75.

Monarch Aluminum Mfg. Co., ordnance, $50,000, $50,000, 75.

Eastern Tool & Mfg. Co., copper cones, $131,850, $131,850, 80.

Detroit Tube & Steel, strip steel, $396,861, $396,861, 60.

Pioneer Steamship Co., transportation, $4,500,000, $4,500,000, 80.

Coleman Co., Inc., ordnance, $494,606, $494,606, 80.

Huntingdon Machine Co., Inc., ordnance, $17,500, $17,500, 90.

Evans Products Co., ordnance, $64,611, $64,611, 85.

Keokuk Electro Metals Co., ferro-silicon: $238,180, $238,180, 85; $1,431,661, $1,431,661, 85.

Goodyear Tire & Rubber Co., gaskets, $33,348, $33,348, 70.

Dewey & Almy Chemical Co., synthetic rubbers, $404,000, $404,000, 70.

B. F. Goodrich Co., fabrics for life rafts, $81,973, $81,973, 65.

Burnell & Co., coils and filters, $7,982, $7,982, 75.

Arizona Portland Cement Co., portland cement, $2,945,758, $2,945,758, 70.

Climax Molybdenum Co., ores (molybdenum, tungsten, tin), $9,273,800, $9,273,800, 75.

Bell & Howell Co., optical apparatus, $1,545,612, $1,545,612, 75.

Pittsburgh & Lake Erie R.R. Co., transportation: $4,959,000, $4,959,600, 80; $5,200,000, $5,200,000, 80.

Diamond Alkali Co., bichromate of soda plant, $311,236, $311,236, 50.

Precision Rubber Products Corp., "O" ring seals, $157,475, $152,487, 70.

Pittsburgh Coke & Chemical Co., phosphate insecticides, $450,000, $450,000, 50.

The Firestone Tire & Rubber Co., reclaimed rubber, $1,956,350, $1,909,050, 70.

New York Air Brake Co., hydraulic pumps, $32,550, $32,550, 85.

Lavoie Laboratories, Inc., electronics, $47,780, $47,780, 85.

Weaver Mfg. Co., service jacks, $34,000, $34,000, 90.

Eaton Mfg. Co., aircraft engine parts, $199,223, $199,223, 85.

Hercules Powder Co., toxaphene, $1,732,334, $1,732,334, 50.

Atlantic Tubing & Rubber Co., reclaimed rubber, $192,304, $192,304, 70.

Electrical Industries Inc., hermatic seals, $18,081, $18,081, 85.

Midwest Rubber Reclaiming Co., reclaimed rubber, $1,459,410, $1,400,900, 70.

Polson Rubber Co., reclamation of rubber, $145,459, $144,459, 70.

Acushnet Process Co., molded rubber parts, $411,266, $389,436, 70.

Stanley Kogut DPA Mechanical Rubber Products Co., moldings, $32,000, $32,000, 70.

Great Lakes Steel Corp., steel ingots: $8,086,000, $8,086,000, 75; $9,156,500, $9,156,900, 75.

Standard Plastics, plastic parts, $36,976, $36,976, 75.

Aldan Rubber Co., rubber coated fabrics, $216,406, $200,356, 65.

Niles Rolling Mill Co., sheet steel, $1,608,865, $1,449,365, 60.

Price Electric Corp., relays, controls, $44,250, $40,750, 80.

Harrington & Richardson Arms Co., ordnance, $36,100, $36,100, 90.

Westinghouse, Workers Agree

Pittsburgh—Westinghouse and IUE-CIO representing about 53,000 workers have agreed upon a 9¢-an-hour wage increase and a modified union shop contract.

The wage boost is contingent upon OPS giving the company the right to include it in revised prices. If such approval is not forthcoming by July 16 and if no other agreement is reached meantime, the workers may strike.

Wyandotte Nordall

This New **Emulsion Cleaner**

Gives You Extra Advantages—

FREE!

Wyandotte Nordall is an emulsion cleaner so outstanding in performance that it has many unique advantages. Yet it compares in cost to low-priced cleaners now on the market. This means that you can switch to Nordall and get the benefits of many of these advantages — at no extra cost!

Wyandotte Nordall is designed for emulsion cleaning of metal parts in pressure spray washers. It can also be used for immersion or soak type cleaning or for cold cleaning of large metal and concrete equipment. Ask your Wyandotte Representative to demonstrate the advantages listed at right.

P.S. — Do you have a conversion or civilian production cleaning problem of any type? Write Wyandotte for free technical information and service.

NORDALL

- *Gives maximum detergency at low cost*
- *Inhibits rust*
- *Contains special solvents which reduce evaporation losses*
- *Has sustained emulsion life*
- *Is noncorrosive*
- *Does not foam*
- *Is always uniform*
- *Is nonflammable and nontoxic under normal use.*

THE WYANDOTTE LINE — products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN
Service Representatives in 88 Cities

Wyandotte
REG. U. S. PAT. OFF.

Do it Mechanically . . . NOW!

Logan Roller Conveyors, feeding brass coils to and away from mill, consist of Logan Downtilter, Logan two-way "Alligator" Switch and heavy duty roller sections. Handling here is about 99% mechanical, and is efficient and economical.

"Manpower will be too scarce in the months ahead to waste it on jobs that can be done mechanically. Moving of materials is a type of work that can be almost completely mechanized. It must be mechanized NOW."

So speaks one of the nation's industrial authorities.

In line with the above, Logan Conveyors free employees for productive activity because Logan Conveyors (a) deliver material to operators at convenient working height (b) keep equipment operating at capacity (c) save time and manpower between processes.

Two generations of conveyor experience are back of every Logan installation. Write for literature, or for engineer to call.

CONCAVE ROLLS available for handling shells and shell casings

Logan Conveyors

75th Anniversary 1876-1951

LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

6712 **Tons,** Boston, construction of steel superstructure for Charlestown connection to Boston Central Artery. (Structural carbon and silicon steel.) Harris Structural Steel Co., Inc., New York, N. Y., low bidder. Completion date is June 30, 1953.

400 **Tons,** Natick, Mass., new building for Laboratory Electronics, Inc., on Worcester Turnpike, to Thomas Worcester, Inc., Boston.

320 **Tons,** State College, Pa., physical education building for Pennsylvania State College, to Anthracite Bridge Co.

Fabricated steel inquiries this week included the following:

225 **Tons,** Columbia, Pa., Columbia Malleable Castings Co., pending.

Reinforcing bar awards this week included the following:

800 **Tons,** Boston, construction of substructure and approaches for Charlestown connection of Boston Central Artery. Berk-Moore Co., Boston, low bidder.

600 **Tons,** Chicago, Continental Elevator Co., to Concrete Steel Co.

320 **Tons,** Fergus Falls, Minn., Orwell Dam Co., to U. S. Steel Co.

275 **Tons,** Chicago, Medical Center, to Joseph T. Ryerson and Sons.

250 **Tons,** East Peoria, Ill., farm creek channel improvement, to U. S. Steel Co.

180 **Tons,** Midland, Mich., Dow Chemical Co., to Concrete Steel Co.

150 **Tons,** Chicago, Illinois Medical Center, to Joseph T. Ryerson and Son.

135 **Tons,** Milwaukee, Chain Belt factory building, to U. S. Steel Co.

Reinforcing bar inquiries this week included the following:

865 **Tons,** Tinley Park, Ill., power plant.

215 **Tons,** Tinley Park, Ill., water treatment plant.

135 **Tons,** Riverdale, N. D., Snake creek embankment.

130 **Tons,** Chicago, Bethseda Home for The Aged.

100 **Tons,** Tinley Park, Ill., sewage treatment plant.

Pick Container Plant Site

New York—Site for a steel container plant in Camden County, N. J., has been selected by United States Steel Products Co. The company has exercised an option to purchase 23.1 acres in Pennsauken Township.

The property is 20 miles southeast and across the Delaware River from the Fairless Works now abuilding at Morrisville, Pa. As yet no date has been set for starting construction.

The plant when built will be similar to the Port Arthur, Tex., plant the company now has under construction. The Port Arthur plant will turn out steel containers for the petroleum, chemical, paint, and food industries.

IRON AGE *markets and prices*

market briefs and bulletins

DO confusion—One major producer has turned down many large orders for steel for the third quarter — now almost entirely booked on DO. Free steel left for the quarter may be 25 to 30 pct. For July it will be 10 to 20 pct. However, all of this will be carryover tonnage as they have booked no new business for that month. There will be no free plates, shapes or hot-rolled sheets. They will take some bars, cold-rolled galvanized and hot-rolled strip.

package mill—Completely integrated package mills designed for production of narrow, thin strip are being built by United Engineering & Foundry Co. No elaborate foundations are required and drive motors are mounted on the fabricated base. The mill will handle a variety of ferrous and nonferrous metals at speeds of 500 to 2000 fpm. Six of the mills have already been ordered.

sounder market—Signs are piling up that the auto market is reviving. Several auto firms are pushing sales hammer and tongs. At least three independents have big sales programs under way and are offering substantial bonuses to salesmen. Results are beginning to show up. Detroit procurement men are especially troubled by shortages of killed deep drawing cold-rolled sheet and crankshaft steel.

price war—The simmering price pot boiled over last week and spewed hard goods items right and left. Price cutting spread out from big New York City stores to other areas. Lagging appliance sales zoomed. On some items stores sold in days the equal of a year's supply. As stocks faded away the price slashing spread to other appliance items. Area supplies on some items were temporarily exhausted.

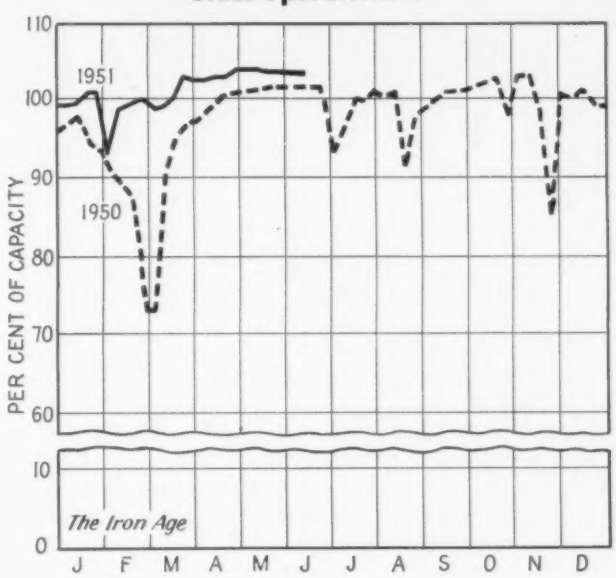
nickel—OPS has authorized price increases in products containing more than 5 pct nickel, but manufacturers of products containing less than 5 pct nickel will have to absorb recent Canadian price rises. The new price order (SR 33, GCPR) requires foundries and rolling mills to absorb up to $6 per ton on the nickel content of their products.

slowdown hurts—A slowdown on the Campbell Works blooming mill of Youngstown Sheet & Tube Co. has affected operations on hot strip and merchant mills. Several hundred employes were idle early this week as hot strip operations were cut 50 pct and merchant mills from 40 to 50 pct. The slowdowns began May 27 in a dispute over incentives —the same point that caused a strike on the mill last March. Melting operations had not been affected early this week.

fuel oil prices—Dollars and cents ceilings on all grades of residual fuel oils on the Atlantic Seaboard were set this week at 17¢ to 31¢ per bbl. by the Office of Price Stabilization. The new ceilings became effective June 4.

shutdown—Sharon Steel Corp. will shut down its 24-in. hot strip mill for 10 days to 2 weeks during installation of a new edger. The project probably will get under way in July.

Steel Operations †



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
May 27	104.0*	107.0*	94.0*	100.5	106.0	104.0	99.0*	108.0*	102.0	97.0	95.0	98.0*	111.0*	103.5
June 3	104.0	106.0	95.0	100.5	106.0	104.0	99.0	108.0	101.0	96.5	95.0	98.0	98.0	103.5

* Revised.
† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METAL PRICES

	May 30	May 31	June 1	June 2	June 4	June 5
Copper, electro, Conn.		24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered		24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York		$1.39	$1.36		$1.36	$1.36*
Zinc, East St. Louis		17.50	17.50	17.50	17.50	17.50
Lead, St. Louis		16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.
*Tentative.

by R.Hatschek

Not So Quiet — While most people were expecting the week to be on the quiet side because of the Memorial Day break last Wednesday, a rash of price changes burst out in the latter part of last week. Reconstruction Finance Corp. cut the price of tin 3¢ per lb to $1.36, Office of Price Stabilization established a dollars and cents price list for zinc scrap and the same office also boosted the ceilings on nickel 6¢ per lb following a similar action by the Canadian government. Rising labor costs necessitated the increase.

Zinc Prices Cut—New zinc clippings had been selling for about the same as virgin metal and other grades were correspondingly high. OPS then issued CPR 43 which rolled back the better grades (new clips engravers' and lithographers' plates) to 14½¢ per lb and ranged downward to 9½¢ per lb for old die cast scrap. Quantity and dealer-dealer premiums are also permitted for certain grades and transportation charges may be included in delivered prices.

Nickel Prices Lifted—The new OPS ruling, effective June 2, permits a 6¢ boost in price for the nickel contained in primary products, mill products and foundry products containing more than 5 pct nickel. Chemicals with 14 pct or more nickel by weight also fall within the new regulation. Nickel and Monel scrap ceilings were unaffected by the increase.

International Nickel Co.'s new prices include: Electrolytic nickel, 59.58¢ per lb, f.o.b. New York warehouses; nickel oxide sinter, 52.75¢ per lb of contained nickel, at Copper Cliff; all "A" nickel mill prices up 5½¢ per lb; and Monel mill prices up 3½¢ per lb.

Scrap Mart Quiet—The only effect that all these price changes had on the scrap metals market was to quiet things down somewhat. The tin price cut is expected to be followed by still more cuts and the zinc ceilings are felt to be the first ripple of a tide of similar OPS orders. As a consequence, buyers are holding off at the moment waiting for lower prices on materials pegged by the general price freeze.

Aluminum Output Stays Up—The 135,402,337 lb of aluminum produced during April continued the industry's high rate of production for the year. The total for the first 4 months of 1951 is 536,833,799 lb, a rate which will bring this year's total to over 1.6 billion lb, second only to 1943's total of 1.84 billion lb. Average daily production, according to the Aluminum Association, was 4.5 million lb, about 1 pct better than the average for the first quarter.

Sheet and plate shipments by member companies dipped to 93,963,648 lb, about 6 million lb less than March, and foil shipments totaled 9,262,781 lb in April compared to 9,811,894 lb for the previous month. Shipments of permanent mold rough castings also dropped slightly in April.

NPA Sees 2-Year Shortage—At the recent Brass Mill Products Distributors meeting in Washington the National Production Authority stated that no real relief from the copper shortage can be foreseen before the end of 1952 or first half of 1953. Warehousemen reported that operations are at about 40 pct of last year's and suggested that the first 9 months of 1950 be used as a base period for allocations.

CMP allotments and DO orders will be used side by side during the third quarter though CMP will get preference. CMP orders are expected by NPA to completely replace the DO system for the metals by the end of the third quarter.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in May based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	$1.3995
Zinc, East St. Louis	17.50
Zinc, New York	18.25
Lead, St. Louis	16.80
Lead, New York	17.00